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# **IMPLICATIONS OF THE CENTRALISED CHRONIC DISPENSING UNIT IN THE WESTERN CAPE PROVINCE, SOUTH AFRICA**

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A mini dissertation presented for the Degree of Masters in Public Health (Health Economics) in the Department of Public Health and Family Medicine, University of Cape Town.

January 2011

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## ***DECLARATION***

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I declare that this thesis is my original work and has not been submitted for any academic or examination purpose at any other university. All the relevant sources of knowledge that I have used during the course of writing this dissertation have been cited/referenced.

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**Esnath Munyikwa**

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**Date**

University of Cape Town

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***ABBREVIATIONS USED***

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AIDS - Acquired Immune Deficiency Syndrome
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CCM – Chronic care model
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CDU - Chronic Dispensing Unit
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CDOP - Chronic Disease Outreach Programme
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CHCs - Community Health Centres
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DALYs - Disability-Adjusted Life Years
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GDP – Gross Domestic Product
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HIV - Human Immunodeficiency Virus
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MSH - Management Sciences for Health
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NGOs - Non-Government Organisations
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PHC - Primary Health Care
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RPM - Rational Pharmaceutical Management
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WHO – World Health Organisation
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## *ABSTRACT*

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**Background:** In the management of chronic patients, it is very important to ensure that the collection of their monthly medication is convenient as it potentially improves compliance and treatment outcomes. In South Africa, chronic medication can be collected at hospitals or at state facilities in the communities such as community health centres (CHCs). However the public sector currently faces logistical challenges leading to inefficient systems with long waiting periods, lack of health worker motivation and high staff turnover which leads to health worker shortages and subsequently inability to adequately meet the health needs of patients.

A new model for dispensing chronic medication was developed in 2005 in the Western Cape whereby chronic medication is dispensed at a central unit and then sent out for patient collection at CHCs, clinics or old aged homes. With this system patients can potentially collect their medication in about 10 minutes. With improved treatment outcomes and reduced waiting times, significant direct and indirect cost savings by patients and the province are expected.

**Objectives:** This study assessed the financial impact of the CDU on a household and provincial level, and determined whether job satisfaction of health professionals has been improved.

**Methodology:** Face to face semi-structured interviews were conducted at CHCs with 132 chronic patients receiving monthly medication from the CDU, 36 patients collecting their monthly medication directly from the CHC dispensary and one pharmacist at each facility. In addition, an in-depth interview with the manager of the CDU was conducted.

## ***PART 1: PROTOCOL***

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### **1. Introduction**

#### ***1.1. Problem statement***

According to the World Health Organisation (WHO), chronic diseases are diseases with a long duration and which have slow progression and the major chronic diseases include cardiovascular diseases, cancer, chronic respiratory diseases and diabetes mellitus. Chronic diseases are the leading cause of mortality and with approximately 60% of deaths in 2005 being attributed to chronic diseases (WHO 2009). Of those deaths, 80% occurred in low to middle income countries (Westaway 2010). Although the WHO does not include Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS) under chronic diseases, it is a disease which is currently being considered as chronic in most disciplines in the health field including health insurance companies. If HIV/AIDS is to be included in statistical calculations of chronic diseases mortality, there will be higher rates in low to middle income countries.

In 2000, South Africa was faced with a quadruple burden of disease with 37% of deaths due to chronic diseases, 30% to HIV/AIDS, 21% to pre-transitional causes for communicable diseases, maternal conditions, pre-natal conditions and nutritional deficiencies and 12% to injuries (Bekker 2003). Westaway (2010) conducted a study to determine the prevalence of chronic diseases in an urban area in South Africa and found that 73% of respondents had at least one chronic disease with the majority being dependent on the public health sector. This high reliance of chronic patients on the public sector is of concern with the challenges facing the public health sector which include inadequate health workers, lack of motivation among workers and patient overload at facilities.

##### ***1.1.1. Rationale and justification of research***

One aspect of managing chronic patients is ensuring convenience on the collection of monthly medication. In South Africa, chronic medication can be collected at hospitals or in community health centres (CHCs). The logistics involved in dispensing chronic medication is not very efficient hence patients wait in long queues to collect their medication. With the staff shortages and long queues at the dispensary, the pharmacists do not have sufficient time to address the health needs of patients. Inadequate management of chronic patients results in increased complications which lead to an acceleration in hospitalisations and increased emergency visits (Steyn *et al* 2008).

A new model for dispensing chronic medication was developed in 2005 in the Western Cape. The model is characterised by a centralised dispensing system whereby chronic medication for 44 CHCs is dispensed at a central unit and then sent out to the CHC for patient collection. This system has been successfully rolled out in the Western Cape metropole region. Patients can collect their medication in about 10 minutes and because of the decreased workload of pharmacy staff, there is more interaction between pharmacists and patients leading to improved treatment outcomes (du Plessis 2008).

As the patients experience improved treatment outcomes and reduced waiting times, significant direct and indirect cost savings by patients are expected. The study aims to determine the financial impact the new centralised dispensing of chronic medication system has on both households and the Western Cape provincial Department of Health, and the level of worker satisfaction the system has introduced. Analysing the economic benefit will aid the decision makers in allocation of resources for chronic disease management and can aid in decisions on expansion of the centralised dispensing system to other provinces and other areas in the Western Cape. If job satisfaction has improved, the retaining of workers in the public sector will be less challenging and there will be less staff turnover.

## **1.2. Literature review**

### ***1.2.1. Models for provision of healthcare***

Different countries have different healthcare models and settings with some differentiation between developed and developing countries. Although some health care models might seem more functional than others, each will have its pros and cons. Virk (2007), suggests that models for healthcare delivery should be broadly classified as primary, secondary and tertiary.

For instance, looking at London, proposals have been made and pilots are being done to develop healthcare services that meet the needs of most Londoners (Healthcare for London: A framework for action 2008). They suggested seven models for the provision of healthcare services and these were:

- Home based facilities: home based care would be provided for most ambulatory patients and for the terminally ill who required palliative care.
- Polyclinics: these are more accessible community health centres although less specialised than hospitals. Primary health care would be provided at these facilities.
- Local hospitals: these would be set up for the provision of inpatient care which excludes specialised services.

- Elective centres: elective centres would be used for specialised surgeries for example knee replacements.
- Major acute hospitals – London has 32 acute hospitals and proposals were made that the hospitals were not being used efficiently. Proposals were made for NHS to appoint some of the hospitals as major and these would then provide the more complex services to a larger volume of patients.
- Specialist services: expansion of specialist centres was encouraged with value being placed on the existing specialising hospitals.
- Academic health science centres: London does not have any academic health centres and proposals were made for their development as these would form a basis for research and clinical competency.

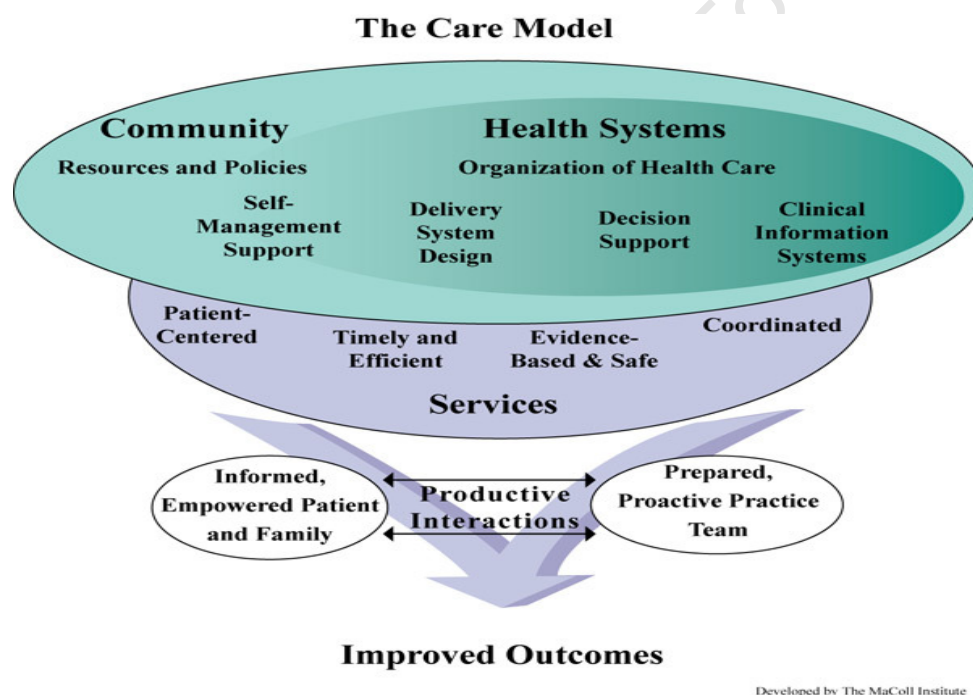
The South African health system is 3 tiered with the primary level focusing mainly on preventative, secondary level on curative and specialist care provided on the tertiary level. The health system structure has similar characteristics to the one proposed in London although it is not broadly defined. Community health centres at the primary level correspond to polyclinics with district hospitals offering the services which are offered at local hospitals. South Africa has a thin differentiation between elective hospitals and acute hospitals, although services offered by such in the UK are similar to the South African provincial hospitals. Academic hospitals also referred to as teaching hospitals in South Africa also offer specialist services.

In South Africa, healthcare is provided by the private sector which spends R43 billion and serves less than 20% population; and the public sector serving the remainder and spending R33.2billion. The private sector is funded by voluntary insurance and out-of-pocket payments with the public sector being funded mainly through taxes (Wadee *et al* 2004). Inequalities exist between the private and public sector with the public sector being overloaded due to the more affordable services by the majority of the population. The private sector in South Africa offers excellent service and is ranked 39 out of 162 by the United Nations (UN). Unfortunately only a minority of the population can access the services. On the contrary, the public sector is over-utilised and direly under-resourced. The ministry of health is working towards a more equitable, efficient and accessible health care provision system (The Business Zone 2008). The idea of National health insurance is underway.

### **1.2.2. Chronic disease models**

With the increase in prevalence of chronic diseases worldwide, the development of chronic disease management models aims to improve both the morbidity and mortality associated

with chronic diseases. The chronic care model (CCM) was developed by the MacColl Institute for Healthcare Innovation, who are based in the US, in the early 1990s and was refined over the years to produce the current CCM in 2003 (Wagner 2001). The CCM identifies important elements in the healthcare system that stimulates improved care of chronic patients. The elements included in the CCM are the community, the health system, self-management support, delivery system design, decision support and clinical information systems. The rationale behind the CCM is to have “healthier patients, more satisfied providers, and cost savings” (Wagner 2001). The CCM is represented in Figure 1 below. The CCM encourages the involvement of different individuals in the health care team and the active involvement of the community to collaborate and meet individual needs of patients. Disease management plans are self-tailored for each individual and the CCM aims to empower and give patients responsibility for the management of their condition (Berenson 2006).



**Figure 1.1: The chronic care model. (Wagner 2001)**

The model can be applied to different populations and settings and for a wide variety of chronic diseases (Wagner 2001). Several countries with different settings have adapted and expanded the model. Studies have shown consensus in the improved processes and outcomes for chronic patients when using the CCM; with decrease use of hospitals and nursing homes (Bodenheimer 2002; Huschka 2003; Berenson 2006).

Berenson (2006) has shown other models which have been implemented for management of chronic diseases. The extent to which physicians are involved varies although individualised

interactions between the health care professional and the patient are emphasised in all models.

From 1999 to 2001, a Chronic Disease Outreach Programme (CDOP) was successfully piloted in South Africa. The CDOP was adapted from the CCM and is aimed at management of chronic renal diseases and risk factors for cardiovascular diseases. Since then developments have been made to the programme with latest developments including a web-based system of patient management (Katz 2007). As with the CCM, the CDOP restructured the health system in a way that the referral process and waiting period for patients to receive specialist renal care decreased.

Successful implementation of CDOP in South Africa gives hope to other developing countries. Considering that the programme was developed in an urban setting it is important to bear in mind accessibility issues and potential barriers for expansion into rural settings. With the shortages of health professionals and low worker motivation in some settings, developing countries may face challenges in successfully implementing chronic disease management programs. With the increasing burden of chronic diseases and high poverty levels which increase mortality, there is a need for the developing world to adequately allocate resources to improve management of chronic diseases.

### ***1.2.3. Models used for chronic medication dispensing***

The process of filling in prescriptions on a monthly basis can be considered a nuisance by patients but if the process is efficiently managed at the point of collection, this perception will change. In a study conducted by Loong (1999), one of the reasons for non-compliance was the long waiting times in pharmacies when collecting medication.

Several methods have been used to dispense chronic medication to patients in South Africa in both the private and the public sectors. In September 2008, a project to roll out chronic medication door to door at the place of residence of those with chronic conditions was initiated in Cullinan which is east of Pretoria. The project was extended to Bekkersdale in Gauteng in December the same year (Department of Health 2008). The extension of the project is a sign of success. The medicine is distributed by community workers under the supervision of pharmacists. The rationale behind the system is to prevent overcrowding at the clinics.

The concept of courier pharmacy which originally developed in the USA, has been growing in South Africa. Clicks pharmacy, one of the leading private retailers in South Africa, couriers chronic medication to the homes, workplace or even holiday destinations of patients (Clicks, Direct Medicines 2008). Some patients collect their medicine which will be in a sealed box

from their nearest Clicks Pharmacy. All the dispensing for chronic medication is centralised. The programme is available to patients on medical aid as well as private patients. As with the project in the public sector in Gauteng, the aim of centralising chronic medication dispensing is to decrease the queues and waiting time in the pharmacies. Other medical aid companies e.g. Bonitas, Polmed, Discovery, are also utilising the courier service noting similar advantages of decreased queues, convenience and improved access (Polmed 2008; Pharmacy Direct 2008).

In the private sector patients can order their chronic medication over the telephone. If the pharmacists can have the medication ready by the time the patient collects it, then this will decrease waiting times thereby increasing patient satisfaction. Developed countries also have online systems which can be used for ordering medication. The health status of chronic patients can be improved by ensuring access to the services which can improve their quality of life (Wagner 1998).

#### **1.2.4. Primary Health care**

Primary Health Care (PHC) is a concept that was developed to deliver health care to communities. Post-apartheid, the South African government started providing free PHC for pregnant women and children under the age of six with more than 1600 clinics being built. The PHC services include a variety of services e.g. immunisation, health promotion, family planning and rehabilitation. (Government communications 2008) Most chronic patients present at PHC facilities for the management of their conditions. Chronic care of patients improves the adherence of patients to their long term therapy which will in turn decrease the burden of chronic diseases and improve individual quality of life. As mentioned previously, it is unfortunate that most PHC facilities are more focused on acute illnesses.

With the provision of free PHC, there was increased utilisation of facilities which led to long waiting times with shorter consultation periods, increased workload by staff and consequently the health workers found their job frustrating (Wilkinson 2001). Once workers lack job satisfaction then the quality of service provided is usually poorly perceived by patients.

In 1994, Roche a pharmaceutical company, Transnet foundation and Colgate established a partnership towards the formation of a primary health care train known as Phelophepa. Phelophepa provides primary health care to the poor remote areas in South Africa. The train operates for about 32 weeks in a year moving from one area to the next on a weekly basis. It has about 16 trailers and adequately trained staff to provide services in the pharmacy, dental and eye clinics, cancer screening and education, psychology, diabetes and smear tests.

Screening tests are free with very nominal fees charged for medication and glasses when required. However since the funds are donor pooled, no one will really be denied access to treatment due to inability to pay (IFPMA 2009). Phelophepa train has been a success in delivering mobile primary healthcare to the poor people in South Africa.

#### ***1.2.5. Patient provider partnerships***

Medical care should assure that “persons with chronic illness have the confidence and are equipped with the skills to manage their condition; the most appropriate treatments to assure optimal disease control and prevention of complications; a mutually understood care plan; and careful, continuous follow-up” (Wagner, 2001). For effective chronic care management, it is important for patients to have continuous relationships with the health care team, in which there is individualisation of care according to patients’ needs and values. This cannot be achieved in a healthcare system with unmotivated staff as they do not have the drive and passion to develop fundamental relationships with their patients.

Health sector performance and in turn health outcomes are dependent on health worker motivation. The provision of quality and efficient health care services are dependent on health workers who are willing to apply themselves fully to their jobs (France, 2004). Outsourcing of the chronic medication dispensing benefits both the patient and the providers of service. The providers, in particular pharmacists have less work load and since the system is running smoothly they are motivated and consequently spend more time with the patients providing comprehensive pharmaceutical care which ultimately improves treatment outcomes of the patients.

#### ***1.2.6. Chronic dispensing unit in the Western Cape***

The Western Cape has the highest prevalence of chronic diseases in particular hypertension, asthma, diabetes, arthritis and hypercholesterol. In addition, high alcohol and ‘tik’ abuse has resulted in an increase in mental health disorders in the province which increases the health care utilisation of state facilities.

Most chronically ill patients queue for their monthly medicines from dawn until sunset at most state hospitals and community health centres. The process of dispensing chronic medication is a long process which requires most patients to sacrifice their day to collect their monthly medicines. The shortages of pharmacists at state hospitals is one of the major contributing factors to the long wait and long queues during monthly chronic medication dispensing process.



To alleviate the problem in the Western Cape, a private-public partnership was developed to distribute medicine to state patients thereby reducing queues and workload at CHCs. Inclusion of the private sector into the public sector can be done by either privatisation or outsourcing (Wadee, 2004). Increasing the role of the private sector in health care delivery is based on assumptions that it will improve service delivery and access of services thereby promoting equity. The centralised dispensing unit (CDU) is an outsourced system. The provision of the service by the private sector was considered to be more cost-effective, hence the public sector left human resource and technology challenges involved in the CDU to the private sector for improved efficiency and delivery of service (du Plessis 2008).

Stable patients are encouraged to collect their monthly chronic medication at CHCs to reduce the pressure at state hospitals. The chronic dispensing unit involves the centralisation of chronic medication dispensing. The unit receives prescriptions from CHCs, prepares individually packed monthly prescriptions and sends them back to the community for distribution. The programme has been running since December 2005 to date with a total of 44 CHCs being serviced. Approximately 4 500 scripts are processed a day with about 75 employed staff. Of the 75, fifty are dispensing staff with the majority being pharmacist assistants. Although some of the traditional concepts of dispensing are maintained, the system is highly automated which enables large volumes of scripts to be done in a day with less errors (du Toit 2008).

Some of the benefits of the CDU which have been observed include (du Toit 2008):

- Cost effectiveness of the process – utilises mainly pharmacists assistants which makes the project economically viable, with only a few pharmacists being employed as they are involved in the accuracy checks at all stages.
- Less waiting time for patients - process takes about 10-15 minutes which means that employed patients do not have to take a leave day every month to collect their monthly medication.
- Less pressure on CHC staff in particular pharmacists who are currently under staffed hence staff is generally motivated leading to improved job performance.
- Pharmacists at CHCs can now spend more time counselling patients on their medication which leads to increased adherence and treatment outcomes.
- Provision of prescription statistics to the provincial department of health e.g. prescribing patterns, drug utilisation and costs, demographic distribution of diseases and corresponding use of medicine etc.

### **1.3. Study aim and objectives**

The aim of the study is to assess the financial impact of the CDU on a household and provincial level.

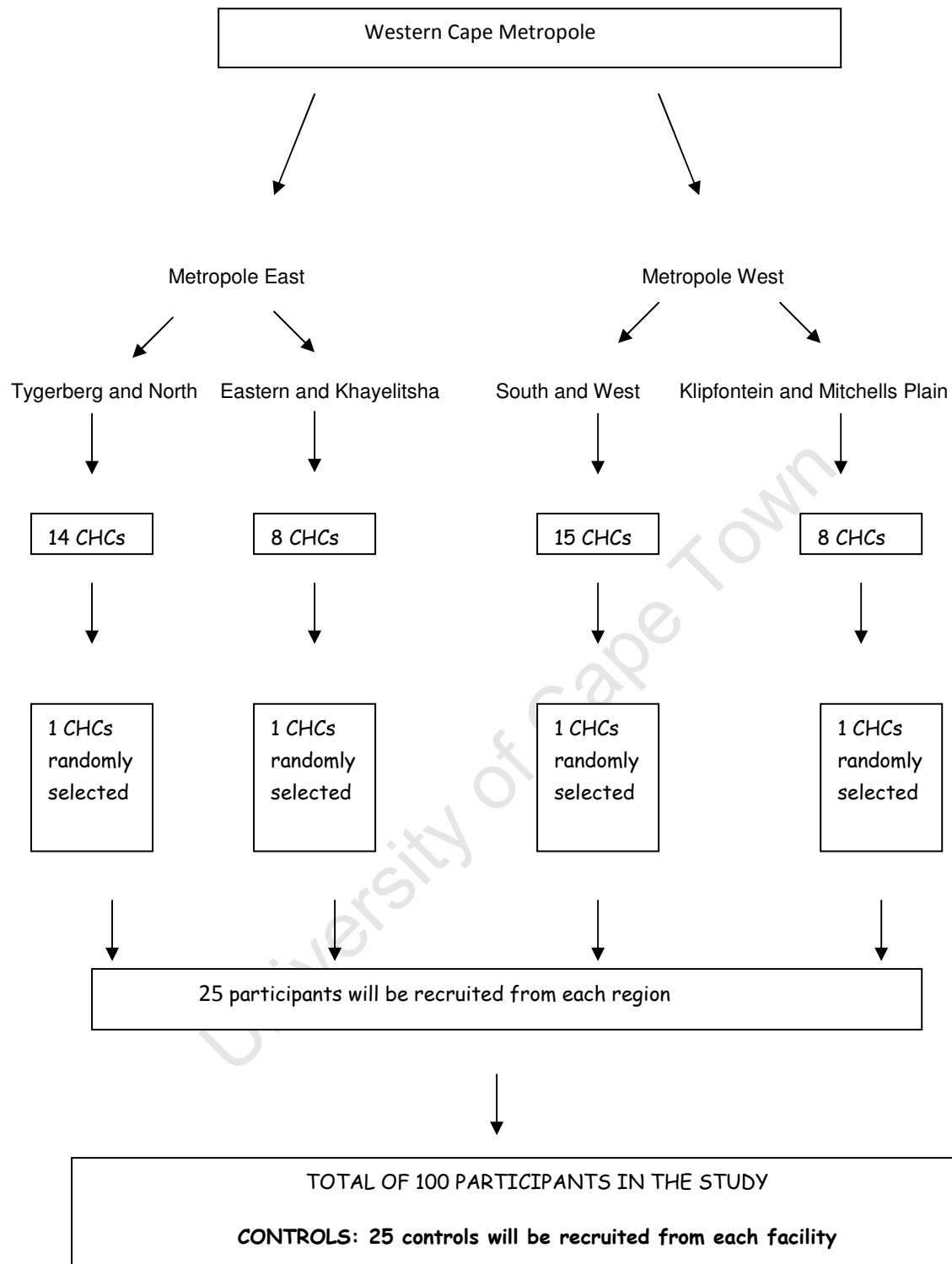
The objectives of the study are to:

1. Estimate and compare the financial impact at household level for the patients receiving the service through the CDU and the patients obtaining their monthly medication directly from the hospitals and CHCs.
2. Determine the financial impact at provincial level of providing a centralised dispensing system e.g. availability of data on the costs of medicine per patient or disease state.
3. Identify whether there has been improved job satisfaction of health professionals at community level.
4. Make recommendations to the relevant stakeholders based on the study findings.

### **1.4. Methods**

#### ***1.4.1. Study population and sampling strategy***

The study population is the chronic patients at CHCs in the Metropole region in Western Cape. Simple random selection will be used to select participants from the CHCs. The Metropole will be divided into 2 regions, the east and the west. The eastern and western region will be subdivided into two further distinct categories. One CHC will be selected in each area with 25 participants being recruited at each facility. A total of 200 participants will be included in the study. Figure 2 below shows a diagrammatic presentation of the multi-stage study design.



**Figure 1.2: Diagrammatic presentation of study design**

**Objective 1: To estimate and compare the financial impact at household level for the patients receiving the service through the CDU and the patients obtaining their monthly medication directly from the hospitals and CHCs.**

Of the 44 CHCs currently providing the service, 4 centres in different geographic locations will be identified to participate in the study. Twenty five employed patients will be randomly selected from each centre with a total of 100 interviews being conducted. Face to face interviews will be conducted using a structured questionnaire to collect the necessary data from the participants currently receiving the service (see Appendix 1). The interviews will be conducted at the CHC when the patients collect their monthly medication. For participants to be included in the study, they have to meet the following criteria:

- They have to be the patient, caregiver or family member in order to decrease non-response bias to some of the questions in the questionnaire.
- They should have used the CDU system and collected their medicine from the particular CHC for at least 2 months.
- They have to be employed

There will be no age restriction for participation. However if the patient is less than 18 years, questions will have to be answered by the parent/guardian collecting the medication.

For comparison, 25 employed participants from the same facilities who are not receiving their medication through the CDU will be identified. Face to face interviews will be conducted using a similar structure to the questionnaire used for the participants at the CHCs currently receiving the service with irrelevant questions omitted (see Appendix 2).

**Objective 2: To determine the financial impact at provincial level of providing a centralised dispensing system.**

In addition to the review of documents on the financial implication at provincial level of the programme, an in-depth semi-structured interview will be scheduled with the manager of the CDU (see Appendix 3). The interview will be recorded and transcribed. The researcher will also take some field notes during the interview.

**Objective 3: To identify whether there has been improved job satisfaction of pharmacists at community level.**

At each of the participating centres a semi-structured interview will be conducted with a pharmacist assistant or pharmacist who directly deals with CDU patients and one senior pharmacist working at the CHCs (see Appendix 4). Some of the questions will be open-ended, and to establish their job satisfaction, a scale of 1-10 will be used to answer the

questions. Pharmacists at the facilities will be asked questions to enable comparison between service delivery before and after the CDU was implemented.

**Objective 4: To make recommendations based on the study findings.**

Based on the study findings from objectives 1- 3, recommendations for the Western Cape Department of Health authorities on the expansion of the chronic medicine dispensing model will be developed.

***1.4.2. Data collection and analysis***

Data collection is expected to run over 5-7 weeks. The principal researcher will recruit four research assistants to help in the interview process. Of the research assistants, three will have to be fluent in Afrikaans and English with one researcher being fluent in Xhosa and English. The questionnaires will be translated from English to Afrikaans and English to Xhosa as all interviews will be conducted in the local language which the respondent is familiar to. A data capturer will capture all data into excel using the coding sequence described in Table 1 and 2 below. A training session will be conducted by the principal researcher on conducting interviews and capturing data.

Data will be analysed both quantitatively and qualitatively. Quantitative analysis of data will be done using STATA.

**Table 1.1: Variables and the coding system that will be used during data analysis for patient questionnaire**

Name of variable	Description	
Self collection of medication	Binary	0=No 1= Yes
Length of time	Continuous	
Age	Ordinal	1= <21 2= 21-30 3= 31-40 4= 41-50 5= 51-60 6= 61-70 7= >70
Gender	Binary	0= Male 1= Female
Racial group	Nominal	1= Black 2= Coloured 3= Asian 4= White
Employment status	Categorical	1=Unemployed 2=Employed (full-time) 3=Employed (part-time) 4=Pensioner/retired 5=Student
Occupation	Categorical	

Name of variable	Description	
Total household income	Ordinal	1=<R2 000 2=R2 001-R5 000 3=R5 001-R10 000 4=R10 001-R15 000 5=>R15 001
Average monthly expenditure on food and groceries	Ordinal	1= R500-R750 2=R751-R1 000 3=R1 001-R1 250 4=R1 251-R1 500 5=R1 501-R1 750 6=R1 751-R2 000 7=>R2 001
Highest grade of education	Ordinal	1= Lower than matric 2= Matric 3= Tertiary
Dependants	Binary	0= No 1=Yes
Number of dependants	Discrete	Number of dependants
Age of dependants	Continuous	Years
Chronic diseases	Categorical	1=cardiovascular diseases, 2=cancer 3=chronic respiratory 4=diabetes mellitus 5=other
Current medication	Categorical	
Improvement in chronic condition	Binary	0= No 1=Yes

Name of variable	Description	
Extent of pharmacist intervention	Ordinal	1= Always 2=Most of the time 3= Sometimes 4= Never
Length of time to collect medication	Continuous	Hours
Childminder	Nominal	1=relative 2=other siblings 3=friends 4=nanny 5=other
Payment	Binary	0= No 1=Yes
Amount paid to childminder	Continuous	Rands
Day off to collect medication	Binary	0= No 1=Yes
Frequency of running out of medication	Discrete	
Purchase of emergency refill	Binary	0=No 1=Yes
Frequency of refill purchase	Discrete	
Amount spent on refill medication	Continuous	Rands
Incurring transport costs when collecting medication	Binary	0=No 1=Yes
Transport costs	Continuous	Rands
Rating of staff relations	Categorical	Scale of 1-10; with 1 being worst and 10 being best.
Rating of public health services		



**Table 1.2 : Variables and the coding system that will be used during data analysis for pharmacist questionnaire**

Name of variable	Description	
Duration of employment at CHC	Discrete	Years
Length of time CHC has been operating with the CDU	Discrete	Years
Time taken to dispense medication	Continuous	Hours
Offering comprehensive pharmaceutical care	Binary	0=No 1=Yes
Rating of job satisfaction	Categorical	Scale of 1-10; with 1 being worst and 10 being best.
Rating of work pressure		
Rating of relationship with patients		
Level of satisfaction with CDU	Categorical	1=Very satisfied 2=Fairly satisfied 3=Satisfied 4=Indifferent 5=Not at all satisfied

### 1.5. Ethical considerations

The research proposal will be submitted to the University of Cape Town Ethics Committee for approval. Written consent will be obtained from the manager of each CHC before commencing the study. Informed consent will also be obtained from each participant prior to participating in the study and with participation being voluntary, the participants can refuse to answer any questions during the interview process (see Appendix 5). Patient confidentiality will be maintained at all stages and patient names will not be linked to the responses in any way. The participants will also be assured that their provision of healthcare will not be affected by their participation. Interviews will be conducted in private or semi-private areas depending on the facilities. Since interviews will be conducted at the facilities when patients collect their medication, participants will not incur any transport costs hence no compensation will be given. The study has no risks or benefits to the participants. However, it is hoped that results of the study will be used by the Department of Health to initiate the establishment of more centralised chronic dispensing units nationally, and improve the service delivery

### **1.6. Dissemination of findings**

The study will be completed in fulfilment of the requirements of the Masters in Public Health (Health Economics) degree. The results of the study will be distributed to interested stakeholders including the provincial department of health of Western Cape. Attempts will be made to publish the study in an appropriate journal.

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## 1.7. WORKPLAN

**Table 1.3: Workplan**

Task Num	Task description	Duration (weeks)	Start date	End date	Responsibility	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July
1	Develop Proposal	13	15-Jul-09	15-Oct-09	Esnath										
2	Ethical Approval	4	15-Oct-09	15-Nov-09	Ethics Committee										
3	Contact CHCs and organise interviews	1	1-Dec-09	10-Dec-09	Esnath										
4	Conduct comprehensive literature review	4	15-Dec-09	15-Jan-10	Esnath										
5	Conduct interviews and capture data	7	10-Jan-10	28-Feb-10	Esnath and research assistants										
6	Analysis of results	4	1-Mar-10	30-Mar-10	Esnath										
7	Prepare 1st manuscript draft	4	1-Apr-10	30-Apr-10	Esnath										
8	Prepare policy brief draft	2	1-May-10	15-May-10	Esnath										
9	Corrections and submission of 2nd manuscript draft	2	15-May-10	30-May-10	Esnath										
10	Compiling 1st draft thesis	2	1-Jun-10	15-Jun-10	Esnath										
11	Corrections and submission of completed final thesis	4	20-Jun-10	15-Jul-10	Esnath										

## 1.8. BUDGET

The research is funded by SIDA.

**Table 1.4: Budget**

Item	Description	Rate	Quantity	Cost/R
Transport	Traveling during preparation of fieldwork of researcher	R350/day	5days	1750
	Car hire expenses during fieldwork	R350/day	35 days	12250
Research assistants	4 assistants	R150/day	R150X4X35days	21000
	1 data capturer	R100/day	R100 x 3days	300
Stationary	Printing questionnaires	35c/page	5pagesX35cX200	350
	Photocopying consent forms	35c/page	30cX220	80
	Clipboards	R30	6	180
	Pencils	R5	6	30
	Erasers	R5	6	30
	Pens	R30	6	180
	Printing final thesis	35c/page b/w & R2/page color	(30cX100) + (20XR2)	76
Translations	From English to Afrikaans(questionnaire and consent forms)	+/-80c/word	1520 words	1220
	From English to Xhosa (questionnaire and consent forms)	+/-80c/word	1520 words	1220
Statistician	Statistical analysis of data			1000
Transcription	Interview with provincial manager	R400/hr	+/- 2hrs	800
	hiring of voice recorder	R350		350
Communication	Telephone usage			600
Training	Refreshments during training	R50/person	R50X6	300
Miscellaneous	Unforeseen expenses			1000
<b>TOTAL</b>				<b>42716</b>

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## ***PART 2: LITERATURE REVIEW***

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### **2.1. Introduction**

An overview of the literature review conducted in the study is given below.

- **Burden of chronic diseases** – This is the first section of the literature review and it covers the global and South African perspective of the chronic disease burden. Trends of mortality and morbidity associated with chronic diseases are described. The financial impact imposed on households, communities and the government due to the disease burden is also reported.
- **Chronic disease management** – With the increasing burden of chronic diseases, it is important to understand the management of chronic patients. Under this section, the different models which have been set up and suggested in different countries were studied and the role of patients in managing their condition was reviewed.
- **Models used for dispensing medication in pharmacies**- One of the ways of improving service delivery is at the point of collecting medication. If patients consider the process of collecting their 'repeat' medication a burden, there is a probability that they will not comply with their medication regime. Therefore, methods of dispensing which will reduce patient waiting time and as some studies suggest increase compliance were discussed.
- **Models for provision of healthcare** – They are different level levels of health care provision with different services being offered at each level. In this section, health care settings in and the hierarchy of level of care across settings were noted.
- **Primary health care** – Management of chronic patients begins at the primary level. This section created an understanding of the principles and components which constitute primary health care as it is important in identifying areas and aspects of optimal management of chronic patients beginning at the entry level of patients. The extent of primary health care provision in South Africa was also reviewed.
- **Health worker and patient satisfaction** – Satisfied health workers are important for ensuring optimal service delivery which will in turn affect the level of patient satisfaction. Determinants and the consequences of both health worker and patient satisfaction are discussed in this section.
- **Contracting of services in the health sector** – The Chronic Dispensing Unit (CDU) is a contracted service between the state and a private company. In this section, different types of contracts were reviewed and some of the terms of the current contract between the state and the service provider of the CDU were pointed out.



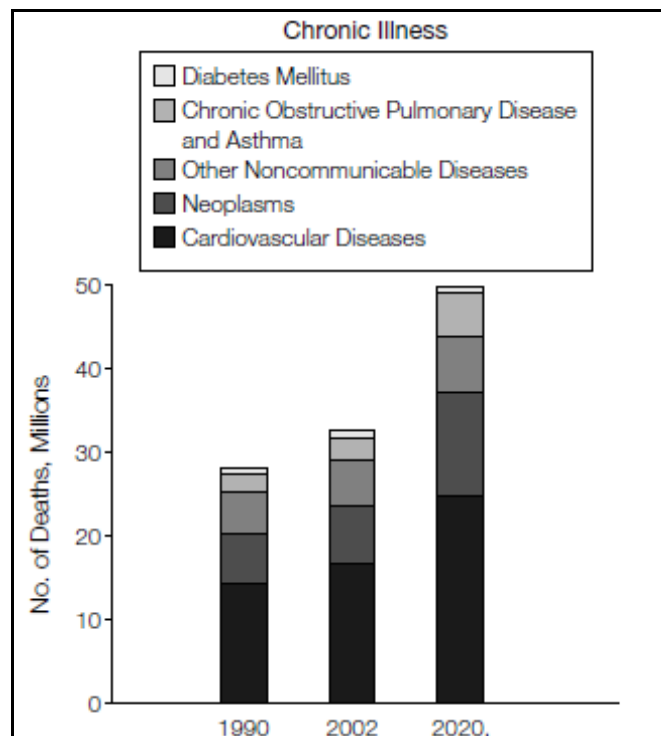
- **The Chronic Dispensing Unit** – The medication dispensing process at the CDU and the reported benefits of CDU were covered.
- **The concept of pharmaceutical care** – Pharmaceutical care has been known to the pharmacy profession for just over two decades but the process of implementing pharmaceutical care has proven to be a challenge in most countries worldwide. Benefits and barriers to providing pharmaceutical care are described in the last section of the literature review.

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## 2.2. Burden of chronic diseases

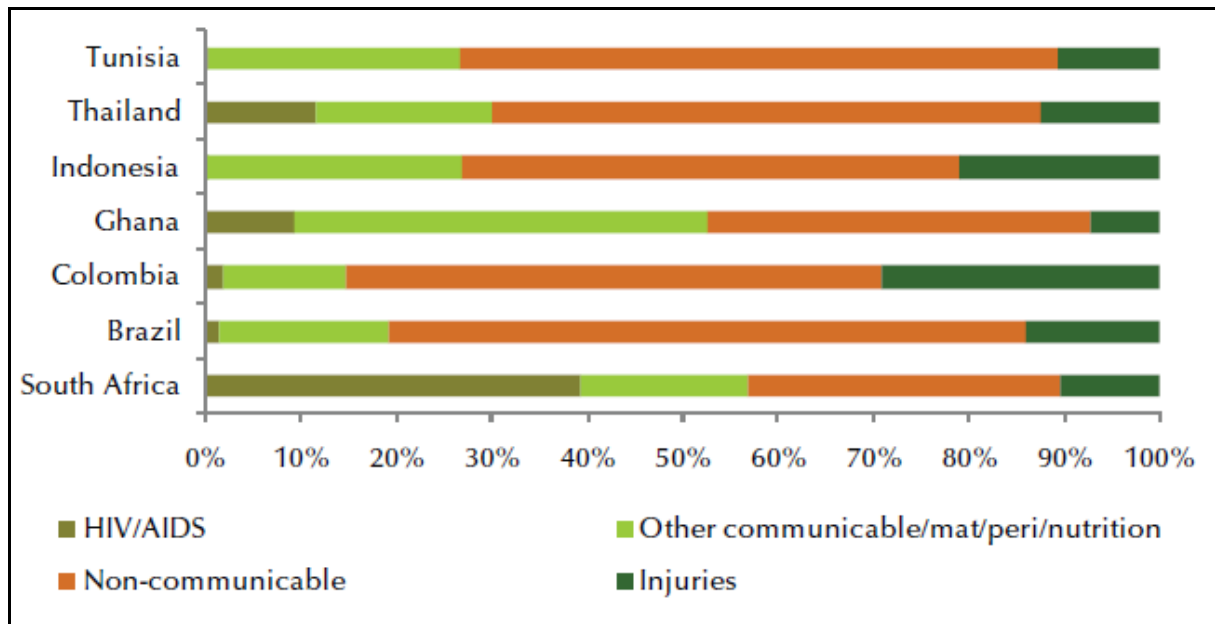
According to the World Health Organisation (WHO), chronic diseases are diseases with a long duration and a slow progression. The major chronic (non-communicable) diseases include cardiovascular diseases, cancer, chronic respiratory diseases and diabetes mellitus. In the developed countries, chronic diseases are a major contributor to the burden of disease. Globally, in 2002, 17million deaths were due to cardiovascular diseases, 7 million due to cancer, 4 million due to chronic lung diseases and almost a million were attributed to diabetes mellitus (Yach *et al* 2004). A projected 41 million of deaths will be due to chronic diseases in 2015 if they are no sustained preventive or treatment interventions (Abegunde *et al* 2007). Chronic diseases are the leading cause of mortality with approximately 60% (35million) of deaths in 2005 being attributed to chronic diseases (WHO 2009). Of those deaths, 80% occurred in low to middle income countries (Westaway 2010). However, should the WHO global goal of reducing chronic disease rates by 2% every year be achieved, 36 million deaths from chronic diseases would be averted between 2005 and 2015 (Abegunde *et al* 2007).

Most of the chronic diseases share common modifiable and preventable risk factors which include tobacco use, inappropriate alcohol use, sedentary lifestyle and an unhealthy diet. (Househam 2010 and Puoane 2008). With the demographic and lifestyle changes associated with urbanisation, chronic diseases are also increasing in developing countries with projected worldwide increases expected in the next 20 years as shown in figure 1 below (Puoane 2008 and Yach *et al* 2004). Globally, in 2000, 2.8% of the world's population lived with diabetes and this figure has been projected to increase by 2030 to 366 million (6.5%) of which 298 million will be in developing countries.



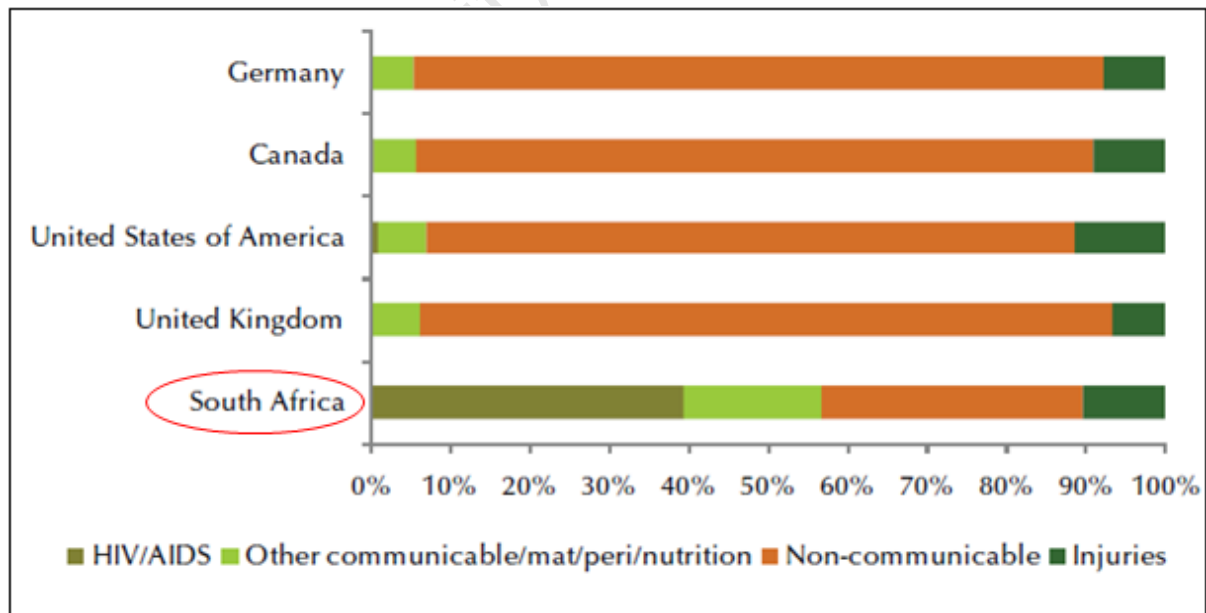
**Figure 2.1: Global mortality from chronic diseases. Adapted from Yach et al 2004.**

South Africa is characterised by a quadruple burden of infectious (HIV and TB), chronic diseases (diabetes, cancer, cardiovascular), perinatal and maternal, and injury related disorders (violence and motor accidents) as shown in figure 2 below. The quadruple trend is characteristic of developing countries. Although Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS) is classified as a communicable disease it is a disease which is currently being considered as chronic in some disciplines in the health field including health insurance companies. Indonesia and Tunisia exhibit an exclusive triple burden of disease as no DALYs are attributed to HIV/AIDS.



**Figure 2.2: Disability-Adjusted Life Years (DALYs) for developing countries 2004.**  
*Adapted from Econex 2009.*

On the other hand, developed countries show a different trend of a triple disease burden as chronic diseases contribute the largest proportion of DALYs. A comparison of South Africa and other developed countries is shown in figure 3 below.



**Figure 2.3: Comparison of Disability-Adjusted Life Years (DALYs) between South Africa and selected developed countries, 2004.** *Adapted from Econex 2009.*

South Africa is among the 23 developing countries which contributed 80% of the mortality burden from chronic diseases in 2005 (Abegunde *et al* 2007). The burden of disease in South Africa is approximately four times that of developed countries and double that of developing countries (Econex 2009). According to the WHO estimates of the burden of disease in South Africa in 2004, chronic diseases resulted in 28% of the total burden of disease measured by disability-adjusted life years (DALYs) (WHO 2008). The major chronic diseases mentioned earlier accounted for 12% of the disease burden (Mayosi *et al* 2009).

Westaway (2010) conducted a study to determine the prevalence of chronic diseases in an urban area in South Africa and found that 73% of respondents had at least one chronic disease with the majority being dependent on the public health sector. The distribution of chronic diseases in South Africa shows inequalities in socioeconomic status of the population as the highest prevalence is seen in the poor urban populations posing an increased demand of services at the public health facilities (Mayosi *et al* 2009). Chronic diseases can result in a medical poverty trap, which is pushing people and their families into poverty or further impoverishment of those who are already poor (Econex 2009). In a study to determine the cause of death and premature mortality in Cape Town between 2001 and 2006, the age-standardised mortality rate showed a social gradient in which people living in the poor sub-district of Khayelitsha have 856 deaths per 100 000 attributable to chronic diseases, compared with rates of 450 - 500 per 100 000 in the wealthy northern and southern sub-districts of Cape Town (Groenewald *et al* 2008). The upstream determinants which are beyond the health sector such as poverty and lack of education are also responsible for this high prevalence of chronic diseases (Mayosi *et al* 2009). This high reliance of chronic patients on the public sector is of concern given the pressure already imposed on state facilities due to acute conditions and given the challenges facing the public health sector which include inadequate health workers, lack of motivation among workers and patient overload at facilities. It is therefore imperative that delivery of primary health care be prioritised and scaled up to meet the rising demand for chronic care (Mayosi *et al* 2009).

In addition to the disease burden, chronic diseases can also impose financial burdens on households, communities, employers and governments. Chronic diseases can lower the household income and decrease the supply of labor which could stimulate early retirement. By caring for sick family members, the probability of workforce participation has been shown to decrease by between 18-22% (Suhrcke *et al* 2005). Employers are also negatively affected by chronic diseases as they are increases in absenteeism, decreased 'on job' productivity and an increase burden on health insurance in cases where the employer contributes to health insurance (Suhrcke *et al* 2005). With the rising disease burden of chronic diseases, low and middle income countries are the most affected and these are the

countries which already have limited health care resources and cannot afford a “health-related setback to economic development” (Abegunde *et al* 2007).

The macroeconomy is negatively impacted by loss of labor due to deaths or morbidity and the costs of treating chronic patients (Abegunde *et al* 2007). In addition, morbidity can increase patients who are reliant on the state due to increase in unemployment and welfare support. Cost of illness studies estimate that the cost of chronic diseases and their risk factors ranges from 0.02% to 6.77% of a country's GDP (Suhrcke *et al* 2005). From 23 selected countries in a study by Abegunde *et al*, there was a combined risk of losing productive earnings worth USD84 billion between 2006 and 2015 from coronary heart disease, stroke and diabetes. Should the global goal of decreasing chronic diseases by 2% be met, USD8 billion lost from income would be saved collectively in the 23 countries which is almost 10% of projected lost earnings (Abegunde *et al* 2007). Given the financial impact chronic diseases have, the government should therefore engage in interventions which improve treatment outcome and increase awareness of risk factors through health promotion and campaigns. Screening tests should be prioritised and carried out on a frequent basis depending on the risk factors as some of the diseases when treated early will have a more positive prognosis thereby lowering treatment and other related costs (Suhrcke *et al* 2005).

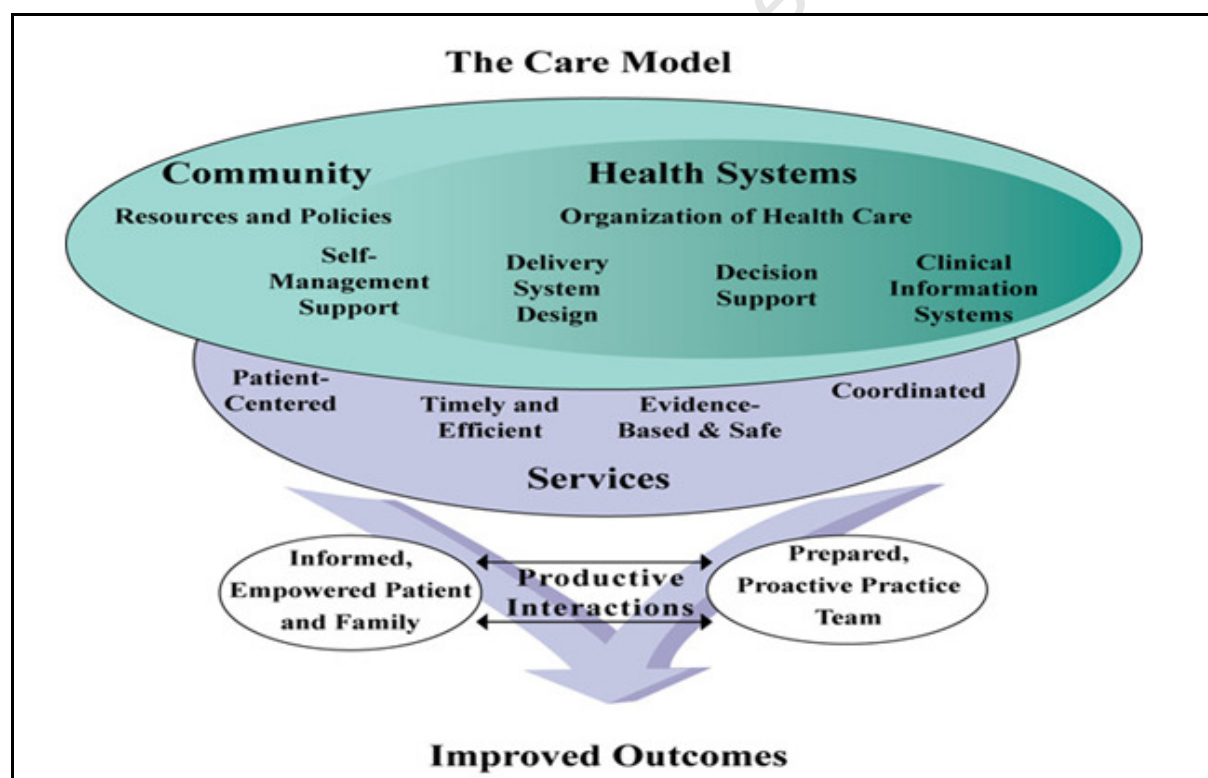
As the burden of chronic diseases increases in South Africa, morbidity will also increase with an estimated R4.2 billion being projected to be spent on national disability grants annually by 2040 (Househam 2010). It is also worth noting that there will also be an increase in orphans who might not only require financial assistance from the state but possibly pose some catastrophic effects on families.

With chronic diseases affecting people during their economic productive capacity years, there is a reduction in productive labor and earning capacity for households which inevitably affects the country's economy as shown in the above discussion. Healthier people are more likely to produce more output compared to their unhealthy counterparts (Suhrcke *et al* 2006). It is therefore to the best interest of the economy of the nation for the government to strive towards achieving the global goal of reducing chronic diseases by 2%.

### **2.3. Chronic disease management**

With the increase in prevalence of chronic diseases worldwide, the development of chronic disease management models aims to improve both the morbidity and mortality associated with chronic diseases. The chronic care model (CCM) was developed by the MacColl Institute for Healthcare Innovation, who are based in the US, in the early 1990s and was refined over the years to produce the current CCM in 2003 (Wagner 2003). The CCM

identifies important elements in the healthcare system that stimulates improved care of chronic patients. The elements included in the CCM are the community, the organisation of the health system, service delivery and the patient-provider relationships. The rationale behind the CCM is to have “healthier patients, more satisfied providers, and cost savings” (Wagner 2001). The CCM is represented in figure 4 below. The CCM encourages the involvement of different individuals in the health care team and the active involvement of the community to collaborate and meet individual needs of patients. Disease management plans are self-tailored for each individual and the CCM aims to empower and give patients responsibility for the management of their condition (Berenson 2006). When patients are more educated on health, they will be able to make more informed decisions and will reduce and hopefully eliminate information asymmetry in the health market. Given that most chronic diseases are due to modifiable risk factors, the strengthened interactions between the patients and the provider will mould the patients in a way that their behavior can change and they can become more compliant with the medication resulting in improved treatment outcomes (Mayosi *et al* 2009).



**Figure 2.4: The chronic care model (Wagner 2001).**

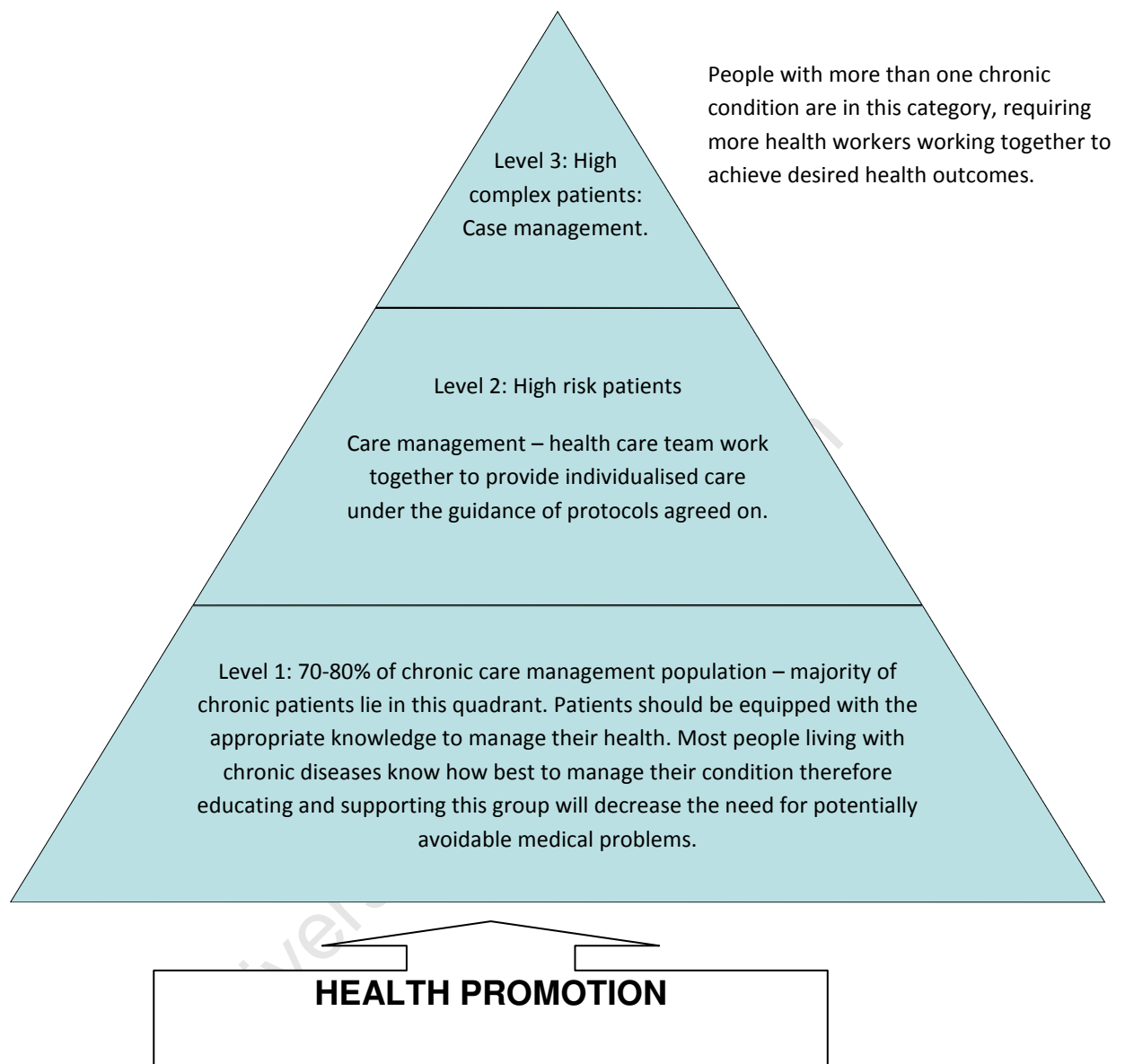
The model can be applied to different populations and settings and for a wide variety of chronic diseases (Wagner 2001). Several countries with different settings have adapted and expanded the model. Studies have shown consensus in the improved processes and

outcomes for chronic patients when using the CCM; with a decrease in use of hospitals and nursing homes (Bodenheimer 2002; Huschka 2003; Berenson 2006).

Berenson (2006) has shown other models which have been implemented for management of chronic diseases. The extent to which doctors are involved varies although individualised interactions between the health care professional and the patient are emphasised in all models. With tailored individual plans, patients will have a better understanding of their disease, treatment plan and will become more involved in their health outcome. Colin-Thome and Belfield (2004), suggest that chronic patients are classified into three different groups and correct classification of patients enables the risk of the patient to be identified as shown in figure 5 below. Tailoring treatment plans therefore depends on the risk classification of the patients. Health promotion is also given as the basis for management of all patients.

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**Figure 2.5: Classification of chronic patients by risk. Adapted from Colin-Thome and Belfield (2004)**

From 1999 to 2001, a Chronic Disease Outreach Programme (CDOP) was successfully piloted in South Africa. The CDOP was adapted from the CCM and is aimed at management of chronic renal diseases and risk factors for cardiovascular diseases. Since then developments have been made to the programme with latest developments including a web-based system of patient management (Katz 2009). As with the CCM, the CDOP restructured the health system in a way that the referral process and waiting period for patients to receive specialist renal care decreased. Successful implementation of CDOP in South Africa gives hope to other developing countries. Considering that the programme was developed in an

urban setting it is important to bear in mind accessibility issues and potential barriers for expansion into rural settings.

Bodenheimer *et al* (2002) emphasise that patients with chronic diseases self manage their condition because they are the ultimate decision makers of their habits and lifestyle (including diet and exercising); and whether they will adhere to their medication regime. As with the CCM, patient-provider partnerships are emphasised. Two key elements are identified in the partnership namely collaborative care and self-management education. Collaborative care is a patient-provider relationship in which the patient and the provider make health care decisions together. In self-management education, patient education dominates with the patient being empowered with skills to solve health problems that could be encountered. Self-management education instils a level of confidence in patients that they can manage their condition. A comparison of the traditional care and collaborative care; and traditional education and self-management education is shown in Table 1 and 2 below.

Issue	Traditional Care	Collaborative Care
What is the relationship between patient and health professionals?	Professionals are the experts who tell patients what to do. Patients are passive.	Shared expertise with active patients. Professionals are experts about the disease and patients are experts about their lives.
Who is the principal caregiver and problem solver? Who is responsible for outcomes?	The professional.	The patient and professional are the principal caregivers; they share responsibility for solving problems and for outcomes.
What is the goal?	Compliance with instructions. Noncompliance is a personal deficit of the patient.	The patient sets goals and the professional helps the patient make informed choices. Lack of goal achievement is a problem to be solved by modifying strategies.
How is behavior changed?	External motivation.	Internal motivation. Patients gain understanding and confidence to accomplish new behaviors.
How are problems identified?	By the professional, eg, changing unhealthy behaviors.	By the patient, eg, pain or inability to function; and by the professional.
How are problems solved?	Professionals solve problems for patients.	Professionals teach problem-solving skills and help patients in solving problems.

**Table 2.1: Comparison of Traditional and Collaborative Care in Chronic Illness.**

**(Bodenheimer *et al* 2002).**

	<b>Traditional Patient Education</b>	<b>Self-management Education</b>
What is taught?	Information and technical skills about the disease	Skills on how to act on problems
How are problems formulated?	Problems reflect inadequate control of the disease	The patient identifies problems he/she experiences that may or may not be related to the disease
Relation of education to the disease	Education is disease-specific and teaches information and technical skills related to the disease	Education provides problem-solving skills that are relevant to the consequences of chronic conditions in general
What is the theory underlying the education?	Disease-specific knowledge creates behavior change, which in turn produces better clinical outcomes	Greater patient confidence in his/her capacity to make life-improving changes (self-efficacy) yields better clinical outcomes
What is the goal?	Compliance with the behavior changes taught to the patient to improve clinical outcomes	Increased self-efficacy to improve clinical outcomes
Who is the educator?	A health professional	A health professional, peer leader, or other patients, often in group settings

**Table 2.2 : Comparison of Traditional Patient Education and Self-management Education**  
(Bodenheimer *et al* 2002).

With the quadruple disease burden, shortages of health professionals and low worker motivation in some settings; developing countries may face challenges in successfully implementing chronic disease management programs. Given the increasing burden of chronic diseases and high poverty levels which increase mortality, there is a need for the developing world to adequately allocate resources and increase its administrative and human resource capacity to improve management of chronic diseases

#### **2.4. Models used for dispensing medication in pharmacies**

Bottlenecks have been found at the point of dispensing medication in most settings worldwide (Tan *et al* 2009). This has led to research on models and techniques that can be used to reduce waiting time of patients during the filling of a prescription. Reducing prescription filling time would lead to the pharmacist spending more time counselling patients on their medication.

Tan *et al* (2009), in a study based in a Singapore pharmacy with 7 pharmacists and 11 pharmacist technicians, evaluated if a waiting time of 30minutes per patient could be achieved using an automated dispensing system in which a robotic system picks and packs medicines which it can handle at 20seconds per item. The pharmacist technician (also known as pharmacist assistant in some countries) packs some of the drugs which cannot be

handled by the robot, for example refrigerated drugs, and then checks that everything has been packed. The pharmacist will then check the packed medicines against the prescription and counsel the patient. They found that to meet the target of a waiting time of 30 minutes per patient, the speed of automation had to be twice as fast reducing the number of pharmacist technicians required by two but two additional pharmacists would be needed.

When it comes to chronic medication, the process of filling in prescriptions on a monthly basis can be considered a nuisance by patients but if the process is efficiently managed at the point of collection, this perception might change. In a study conducted by Loong (1999), one of the reasons for non-compliance was the long waiting times in pharmacies when collecting medication. When collecting medication, most patients do not want to wait for long although they can wait for the same time in the bank or in a grocery store.

Several methods have been used to dispense chronic medication to patients in South Africa in both the private and the public sectors. In September 2008, a project to roll out chronic medication door to door at the place of residence of those with chronic conditions was initiated in Pretoria. The project was extended in Gauteng in December the same year (Department of Health 2008). The extension of the project is a sign of success. The medicine is distributed by community workers under the supervision of pharmacists. The rationale behind the system is to prevent overcrowding at the clinics.

The concept of courier pharmacy which originally developed in the USA, has been growing in South Africa. Clicks pharmacy, one of the leading private retailers in South Africa, delivers chronic medication to the homes, workplace or even holiday destinations of patients (Clicks, Direct Medicines 2008). Some patients collect their medicine which will be in a sealed box from their nearest Clicks Pharmacy. All the dispensing for chronic medication is centralised. The programme is available to patients on medical aid as well as private patients. As with the project in the public sector in Gauteng, the aim of centralising chronic medication dispensing is to decrease the queues and waiting time in the pharmacies. Other medical aid companies e.g. Bonitas, Polmed, Discovery, are also utilising the courier service noting similar advantages of decreased queues, convenience and improved access (Polmed 2008; Pharmacy Direct 2008).

In the private sector patients can order their chronic medication over the telephone. If the pharmacists can have the medication ready by the time the patient collects it, then this will decrease waiting times thereby increasing patient satisfaction. Developed countries also have online systems which can be used for ordering medication. The health status of chronic patients can be improved by ensuring access to the services which can improve their quality of life (Wagner 1998) and this includes efficient means of collecting their monthly refills.

## 2.5. Models for provision of healthcare

Different countries have different healthcare models and settings with some differentiation between developed and developing countries. Although some health care models might seem more functional than others, each will have its pros and cons. Virk (2007), suggests that models for healthcare delivery should be broadly classified as primary, secondary and tertiary.

Proposals have been made and pilots are being done to develop healthcare services that meet the needs of most people in London (Healthcare for London: A framework for action 2008). Seven models for the provision of healthcare services have been suggested and these include:

- Home based facilities: home based care would be provided for most ambulatory patients and for the terminally ill who required palliative care.
- Polyclinics: these are more accessible community health centres although less specialised than hospitals. Primary health care would be provided at these facilities.
- Local hospitals: these would be set up for the provision of inpatient care which excludes specialised services.
- Elective centres: elective centres would be used for specialised surgeries for example knee replacements.
- Major acute hospitals: London has 32 acute hospitals and proposals were made that the hospitals were not being used efficiently. Proposals were made for NHS to appoint some of the hospitals as major and these would then provide the more complex services to a larger volume of patients.
- Specialist services: expansion of specialist centres was encouraged with value being placed on the existing specialising hospitals.
- Academic health science centres: London does not have any academic health centres and proposals were made for their development as these would form a basis for research and clinical competency.

The South African health system structure has similar characteristics to the one proposed in London although it is not broadly defined. It is a 4 tiered system with primary care clinics and community health centres, district hospitals, regional hospitals and tertiary (academic) hospitals. The scarcity of resources led to the hierarchy of care for public sector patients with patients accessing higher levels of care only by referral (Cullinan 2006). The first point of entry is free and this is the primary care offered at the clinics and community health centres. The primary care level should be able to comprehensively offer all the elements of primary health care which are discussed later. The four levels of hospitals are meant to offer different

levels of service. At district hospitals, patients receive basic diagnostic and therapeutic services. Regional hospitals provide at least one specialist service with tertiary hospitals providing specialist care (Cullinan 2006).

Comparing the South African health system structure to that in London, in South Africa there is a thin differentiation between elective hospitals and acute hospitals, although services offered by such in the UK are similar to the South African provincial hospitals. Academic hospitals also referred to as teaching hospitals in South Africa also offer specialist services.

In South Africa, healthcare is provided by the private sector which spends R43 billion and serves less than 20% population; and the public sector serving the remainder and spending R33.2billion. The private sector is funded by voluntary insurance and out-of-pocket payments with the public sector being funded mainly through taxes (Wadee *et al* 2004). Inequalities exist between the private and public sector with the public sector being overloaded due to the more affordable services by the majority of the population. The private sector in South Africa offers excellent service and is ranked 39 out of 162 by the United Nations (UN). Unfortunately only a minority of the population can access the services. On the contrary, the public sector is over-utilised and direly under-resourced. The ministry of health is working towards a more equitable, efficient and accessible health care provision system (The Business Zone 2008). The idea of National health insurance is underway.

## **2.6. Primary Health care**

The practise of Primary Health Care (PHC) was endorsed in 1978 during the International Conference of PHC in Alma-Ata. PHC is defined as (WHO 1978):

*'Essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination.'*

PHC includes the following eight essential components (Wolvaardt *et al*, 2008):

- health promotion
- food supply, nutrition, water and sanitation
- family planning, maternal and child care
- immunisation
- prevention and control of locally endemic diseases
- appropriate treatment of common diseases
- promotion of mental, emotional and spiritual health
- provision of essential drugs

Most chronic patients present at PHC facilities for the management of their conditions and in theory primary health care is best positioned to address the needs of chronic patients (Beaglehole *et al* 2008). Since most interventions for preventing and managing chronic care are at the primary level, improved care and facilities at this level will greatly benefit the higher levels of care as they will be less emergency hospital visits and less admissions due to chronic disease complications (Colin-Thome and Belfield 2004). Chronic care of patients improves the adherence of patients to their long term therapy which will in turn decrease the disease burden and improve individual quality of life. “Investing in PHC delivery is investing in human capital as healthy human capital is the foundation of productivity and prosperity” (Chan 2009).

Accessibility remains a cornerstone to ensuring delivery of healthcare. Post-apartheid, the South African government started providing free maternal and child healthcare which later extended to include free PHC services at public health facilities and the provision of social welfare grants to those who are disadvantaged (Government communications 2008). The South African government has also invested in decentralising health care with per capita expenditure on PHC increasing from R58 in 1992/93 to R183 by 2005/06 (Cullinan 2006). Clinics and CHCs offer PHC services and they are mainly run by nurses with doctors being available for consultation and in most cases should ideally visit the centres regularly.

To deliver primary health care, partnerships; links and external support with technical and financial resources are required. An integrated approach to the management of chronic disorders, irrespective of the cause, is not only feasible but desirable within primary health care (Kautzky and Tollman 2008). In 1994, a pharmaceutical company known as Roche, Transnet foundation and Colgate established a partnership towards the formation of a primary health care train known as Phelophepa. Phelophepa provides primary health care to the poor remote areas in South Africa. The train operates for about 32 weeks in a year moving from one area to the next on a weekly basis. It has about 16 trailers and adequately trained staff to provide services in the pharmacy, dental and eye clinics, cancer screening and education, psychology, diabetes and smear tests. Screening tests are free with very nominal fees charged for medication and glasses when required. However since the funds are donor pooled, no one will really be denied access to treatment due to inability to pay (IFPMA 2009). Phelophepa train has been a success in delivering mobile comprehensive, affordable and accessible primary healthcare to the poor people in South Africa.

The extent of implementing PHC in South Africa has however been limited by a combination of factors which include health worker migration leading to massive health worker shortages, increasing burden of diseases for the poorest people, curative orientation of services and

insufficient capacity to absorb resources in the public sector (Kautzky and Tollman 2008). In addition to the personnel shortages, the distribution of health workers is greatly biased towards the private sector although the private sector provides services to less than 20% of the population (Kautzky and Tollman 2008). With the exodus of trained health workers, the health facilities are faced with not only shortages in health workers but 'shortages in trained health workers' with 40% of PHC facilities employing nurses who are specifically trained for PHC. Ironically, "scarce skill allowance", which is a monetary incentive offered by the government to certain categories of nurses to retain them, does not include PHC nurses although these are the most over-burdened staff (Cullinan 2006). With the provision of free PHC, there was increased utilisation of facilities which led to long waiting times with shorter consultation periods, increased workload by staff and consequently the health workers found their job frustrating (Wilkinson 2001). Once workers lack job satisfaction then the quality of service provided is usually poorly perceived by patients.

## **2.7. Health worker and patient satisfaction**

Civil servants have a reputation of being lazy and unmotivated to work (Delfgaauw *et al* 2008) and this stereotyping is applicable to the public sector in South Africa. The public health sector serves about 85% of the population with about a third of the health workers being employed in the public sector (Rothmann 2007). Health sector performance and in turn health outcomes, worker retention, absenteeism and turnover are dependent on health worker motivation and job satisfaction. There is a positive correlation between health worker job satisfaction, patient satisfaction and treatment outcomes (Pillay 2009). A study in Turkey showed that public health workers had low job satisfaction consequently giving rise to low quality of health care provision (Bodur 2002). The provision of quality and efficient health care services are dependent on health workers who are willing to apply themselves fully to their jobs (Franco 2004).

In a study to determine the determinants of occupational stress of hospital pharmacists in South Africa, high levels of workload and lack of resources were among the factors identified (Rothmann 2007). With the rise of chronic patients, there is an increase in the population requiring prescription medication thereby placing an increasing demand on pharmacists' services. Like any other health professional, it is therefore imperative that the stress on pharmacists be lessened where possible to ensure that the patients' safety during dispensing is not compromised. In addition to the negative impact low motivation can have on the performance of health workers, it can potentially add on to the push factors for migration. In the public sector, hospital pharmacists frequently have had to undergo disciplinary hearings by the governing board due to dispensing errors. The disciplinary



committee was concerned about the workload of the pharmacists which was twice the acceptable norm and could be the reason more dispensing errors in the public sector compared to the private sector (Rothmann 2007).

In public health sector facilities in South Africa, the staff shortages means that there is more pressure on those who are working and providing the services to the patients. However this leads to worker burn-out, demoralisation and high absenteeism which will in turn reduces the efficiency of healthcare service provision (Ogresta *et al* 2008). Although health worker shortages are typical of most countries, poor management at the different levels of healthcare and government exacerbates the situations to different extents in the different countries (Cullinan 2006).

Even though health workers are satisfied with their jobs, Gilson and Erasmus suggest that there should be a certain level of trust between the general population, the health workers and the policy makers if service delivery is to improve (Gilson and Erasmus 2006). This is because ultimately service delivery is not determined by an individual but it is the outcome of a complex series of relationships, involving the actions of many different people. Trust builds co-operative relationships which result in people working towards the same goal and thereby providing effective and efficient service delivery (Gilson and Erasmus 2006).

Medical care should assure that “persons with chronic illness have the confidence and are equipped with the skills to manage their condition; the most appropriate treatments to assure optimal disease control and prevention of complications; a mutually understood care plan; and careful, continuous follow-up” (Wagner 2001). For effective chronic care management, it is important for patients to have continuous relationships with the health care team, in which there is individualisation of care according to patients’ needs and values. This cannot be achieved in a healthcare system with unmotivated staff as they do not have the drive and passion to develop fundamental relationships with their patients.

Patient satisfaction is determined by the perceived reliability of the doctor to competently provide the required treatment to the patient, the extent of the medical personnel to respond to the needs of the patient, physical appearance of the facility, quality of communication regarding diagnosis, medication and treatment outcomes between patient and health workers; extent of empathy shown by health workers to the patients; treatment costs and the availability and accessibility of health workers (Sajid 2007). Providing quality care to patients builds the foundation to the well-being of the community and ultimately the economic development of a country (Sajid 2007).

In South Africa the services in the public sector when compared to the private sector are considered to be inefficient and ineffective in terms of ensuring affordable, accessible and appropriate healthcare as evidenced by patient dissatisfaction (Pillay 2008). Patient level of satisfaction or dissatisfaction has been used to measure the quality of the service and determines the attitude of the patients towards the service (Chahal and Gupta 2004). Determining the level of patient satisfaction can therefore be used to improve the quality of services. In addition, if patients are satisfied with a service they are more inclined to being compliant to their treatment and to attend any follow-up consultations resulting in improved health outcomes (Kumari *et al* 2009). In a study by Kumari *et al* to determine the level of patient satisfaction in state health facilities in India, 99.5% of the patients reported a short waiting time of less than 30 minutes at primary health facilities with a third of the patients indicating that the facility was overcrowded. Reduced waiting times have been shown to increase patient satisfaction in a study conducted in an outpatients pharmacy in Michigan (Slowiak *et al* 2008) and also increase patient compliance to medication (Loong 1999). The level of satisfaction with patient-doctor relationship decreased from 73.3% in tertiary facilities to 60.5% in primary health care centres. Patients in PHC centres (40.9%) were unhappy with the dosage form of their medication. In the study the majority of the patients (71.6%) found transport costs to be affordable which shows that patients are prepared to pay to receive medical attention.

In health systems where the public sector is used mainly by patients who cannot afford private care, the socioeconomic status of the patients should be taken into account as it can greatly influence the perception of patients. Patients may be afraid of expressing their dissatisfaction in a service simply because it is all they have and they are scared of losing it (Palmer 2003). For instance, in South Africa at the primary health care level, whereby patients do not pay for medical attention in state facilities, patients could be unhappy but ultimately perceive that 'beggars cannot be choosers.' On the other hand, in a competitive private market, the patients could more openly express their dissatisfaction in a service as they believe that since they are paying they are obliged to receive satisfactory service and if they are not content there is a probability that they will not use the service (Slowiak *et al* 2008). Unfortunately the structure of the health system in South Africa creates inequities, giving more reason for public/private partnerships to be created.

## **2.8. Contracting of services in the public health sector**

Public intervention in health care has been favored because health care is a basic human right which should be available to everyone irrespective of ability to pay. In low and middle income countries the population in the lower socio-economic status who have a

disproportionately large burden of disease, there is limited access to health services due to multiple factors which include the population residing in underserved areas and they are less likely to engage in lifestyle modifications for prevention of disease. They also have inadequate health education and do not afford to purchase healthcare (Bhattacharyya *et al* 2010).

If provision of health care is left to the private sector, due to the asymmetry in health information, the private providers could provide services that may not necessarily benefit the patients but rather lead to an increase in profits of the private organisation (Bhattacharyya *et al* 2010). However, the public sector is not always in a position to meet all the demands of its population and even if they do sometimes the service is perceived as poor which explains why the private sector is growing in low to middle income countries.

The private sector has brought about innovative ideas in the provision of health care which improve affordability, accessibility and quality of services to the poor. By investment in interventions to control the burden of chronic diseases the economy of a country can benefit (Puaone 2008). The private for-profit and not-for-profit sectors can play a role in each of the eight components of primary health care mentioned earlier. The role of the private sector only in the provision of drugs will be discussed in this thesis.

In an effort to improve public service delivery, government contracts with non-government organisations (NGOs), for-profit private organisations or individual companies has shown to have positive outcomes (Loevinsohn and Harding 2005). The resources of the private sector are utilised to benefit and improve the efficiency of the public sector (Palmer 2000). As shown by a systematic review conducted by Loevinsohn and Harding, they are different ways in which health services can be contracted out (see table 3 below). These contracts will depend on five factors:

- Who determines on the services to be provided and where they are to be provided?
- Who selects the service provider?
- Who manages the project?
- Who manages and supplies the infrastructure e.g. drugs, personnel, equipment etc.?
- Who is the source of funds?

The government should have adequate capacity including administrative skills to manage the contractual agreement (Palmer 2000). Contracting is not a solution to a weak or malfunctioning government management system as it actually places new demands on the management (Abramson 2001). Contracts should be monitored according to set target

indicators for example increasing coverage of a particular prevention strategy, reducing waiting times or improving quality of care and it should be stipulated how performance will affect remuneration of the service provider. For each indicator used to measure performance, the baseline should be determined prior to implementing the service through a contracted service provider.

	Initiator (defines services and area)	Selector (who chooses provider)	Manager	Production Infra-structure	Source of Financing	Example
1. Government services	Government	Government	Government	Government	Government†	Government primary health care centres
2. Inter-government agreements	Government-1*	Government-1	Government-2*	Government-2*	Government-1†	Transfer of funds from federal to provincial governments
3. Management contracts	Government	Government	Private sector	Government	Government†	Government hires a private sector manager to manage existing Government health services
4. Service delivery contracts	Government	Government	Private sector	Private sector	Government†	Government hires NGO to provide services where none currently exist
5. Grants to private sector	Private sector	Government or donor	Private sector	Private sector	Government (+/- NGO or community contribution)	NGOs submit proposals to Government for needs identified by community or NGO
6. Vouchers	Government	Consumer	Private sector	Private sector	Government (and/or donor)	Female sex workers are provided vouchers for curative care which they can redeem at practitioners of their choice
7. Franchising	Private sector	Consumer	Private sector	Private sector	Consumer (+/- subsidy from Government or donor)	Private practitioners join franchise network providing reproductive health services
8. Private sector services	Private sector	Consumer	Private sector	Private sector	Consumer or NGO/donor	1. NGO establishes health services in slum areas using its own funds 2. For-profit providers establish private clinic

NGO, non-governmental organisations, +/- =with or without. \*Government-1=higher level of government, \*Government-2=local level of government. †Can be supplemented by formal or informal user-charges.

**Table 2.3: Classification of contracting out for health services (Loevinsohn and Harding 2005).**

Having a distinct difference in service provision in the private and public health care sector in South Africa it is vital to ensure that the less privileged majority of the population who are dependent on the public health sector receive quality care. The private not-for-profit sector in South Africa is involved in improving service delivery and accessibility to essential drugs in different ways. A large number of NGOs are directly providing access to antiretrovirals (ARVs) by operating not-for-profit clinics, or contracting private general practitioners to see uninsured HIV-positive patients usually in the public sector. In such instances, which would be classified as entry 5 in table 3 above, the NGO determines where and which areas they will be delivering aid based on the need in different areas. Management Sciences for Health (MSH), through the Rational Pharmaceutical Management Plus (RPM Plus) programme assists the public sector in strengthening systems for pharmaceutical management in support of HIV and AIDS scale-up activities. Their activities focus on strengthening the policy and legal framework and improving information management systems (Wolvaardt 2008). Although NGOs have improved service delivery, they are multiple competing organisations which can result in duplicate programs. It has also been noted that some health workers are pulled away from their routine duties which hinders the level of expected service delivery to the other patients.

For-profit registered pharmacies and dispensing doctors provide drugs to the insured and uninsured population dependent on the private health sector. The private sector is also the source of procurement for all pharmaceutical companies for the public sector. Once the public sector has purchased the drugs, they usually distribute them through State facilities (Wolvaardt 2008). However, in the Western Cape, the provincial department of health has contracted a private sector pharmaceutical company, IPM (Pty) Ltd., to distribute all chronic medication to stable chronic patients in the province until November 2010 unless they win the tender bid again (CDU SLA 2010). The contract is classified as a service delivery contract, entry 4 in the table above. The state identifies the community health centres where the service is to be provided and state employed doctors at facilities will determine patients who receive the medication from the CDU. This implies that the scale of operation is determined by the state and the contracted company should have the capacity to expand when it is deemed necessary. The department of health will provide the building where all operations will take place and provide civil, electrical and mechanical services (CDU SLA 2010). All costs of infrastructure to renovate and/or upgrade the building in order to run operations will be borne by the private institution and reimbursed by the state upon prior approval. In addition, the service provider is responsible for personnel and ensuring that they are competent. However, IPM can sub-contract another company to perform any other

activities for example transportation and it will be responsible for the actions and payment of the sub-contracted firm (CDU SLA 2010).

All the medicine dispensed by the CDU will be ordered from the department of health. IPM does not bear the costs of drugs unless the drugs expire at the CDU due to mismanagement. IPM will collect the prescriptions from the CHCs and dispense the medication into patient ready packs in a manner that complies with the Good Pharmacy Practice (GPP) guidelines. To ensure that patients report to the CHC to collect their medication, the service provider has to send a reminder cellphone message to the patients three days before their collection date (CDU SLA 2010).

Due to the successful service provision by IPM, for the new contract the department of health has increased the number of sites and geographical area where medicines are to be delivered; and the delivery to patients' homes at a fee which should be affordable and acceptable by the department of health. Currently only medicines (excluding ARVs and TB drugs), test strips and insulin syringes for diabetics are delivered. The new service providers will also be required to deliver surgical consumables for stoma patients and paraplegics.

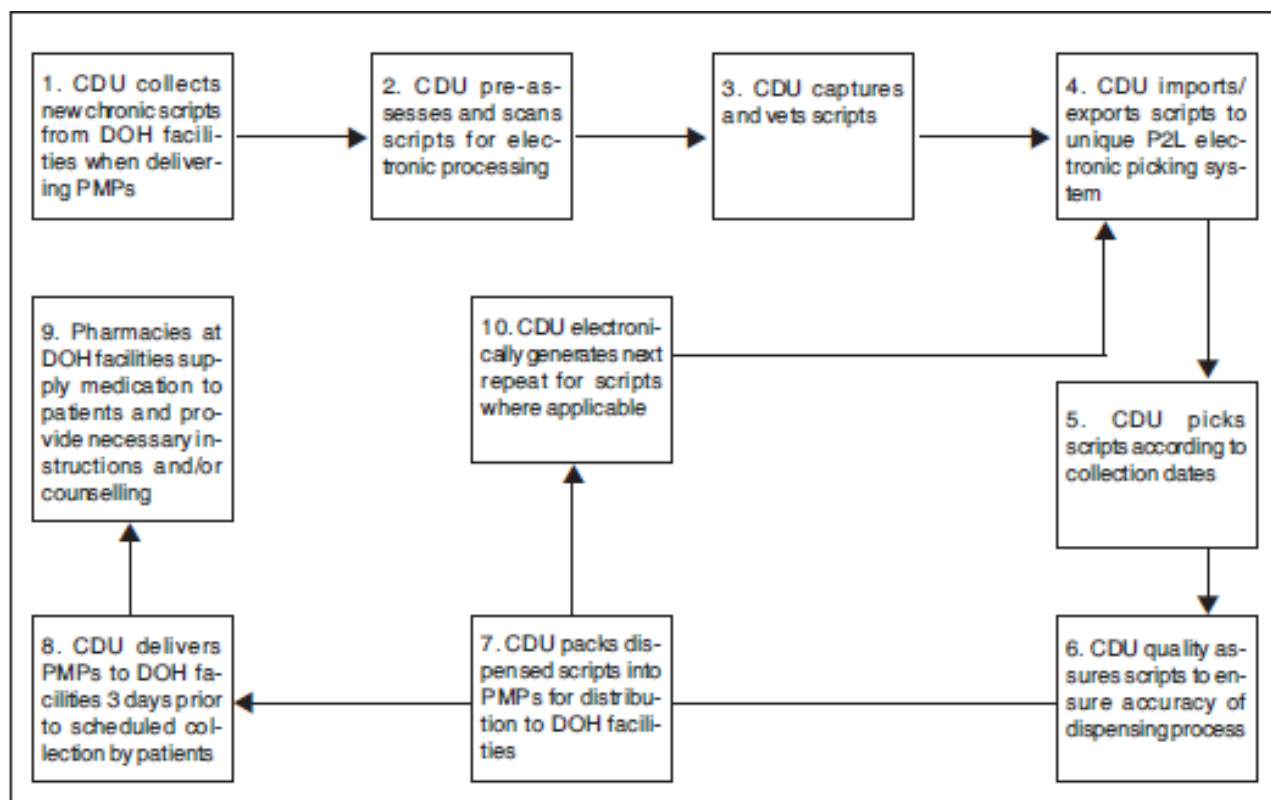
## **2.9. Chronic dispensing unit (CDU) in the Western Cape**

The Western Cape has the highest prevalence of chronic diseases in particular hypertension, asthma, diabetes, arthritis and hypercholesterol. In addition, high alcohol and 'tik' abuse has resulted in an increase in mental health disorders in the province which increases the health care utilisation of state facilities.

Most chronically ill patients queue for their monthly medicines from dawn until sunset at most state hospitals and community health centres. The process of dispensing chronic medication is a long process which requires most patients to sacrifice their day to collect their monthly medicines. As mentioned earlier, the shortages of pharmacists at state hospitals is one of the major contributing factors to the long wait and long queues during monthly chronic medication dispensing process.

To alleviate the problem in the Western Cape, a centralised unit for dispensing chronic medication was introduced in 2005 to distribute medicine to state patients thereby reducing queues and workload at CHCs. Those patients whose condition is stabilised and under control are encouraged to collect their monthly chronic medication at CHCs to reduce the pressure at state hospitals. The unit receives prescriptions from CHCs, prepares individually packed tamper proof parcels which are identified with outer labels and sends them back to

the CHC for distribution. The flow diagram in figure 6 below shows the simplified process of centralised dispensing.



P2L – Pick to light; PMP- Patient Medicine Parcel; CDU- Chronic Dispensing Unit; DOH- Department of Health

**Figure 2.6: Work flow in the CDU model (du Toit 2008).**

Although some of the traditional concepts of dispensing are maintained, the system is highly automated which enables large volumes of scripts to be done in a day with less errors (du Toit 2008). Of the 75 people working at the CDU, fifty are dispensing staff with the majority being pharmacist assistants.

Some of the benefits of the CDU to patients, pharmacy staff and the department of health which have been observed include (du Toit 2008):

- Cost effectiveness of the process – utilises mainly pharmacists assistants which makes the project economically viable, with only a few pharmacists being employed as they are involved in the accuracy checks at all stages. With the paucity of pharmacists in South Africa, the utilisation of pharmacist assistants is also a very sensible personnel move.



- Less waiting time for patients - process takes about 10-15 minutes which means that employed patients do not have to take a leave or off day every month to collect their monthly medication.
- Improved treatment compliance and disease management. Patients also have a better perception on the quality of public health services.
- Less pressure on CHC staff in particular pharmacists who are currently under staffed hence staff is generally motivated leading to improved job performance.
- Pharmacists at CHCs can now spend more time counseling patients on their medication which leads to increased adherence and treatment outcomes.
- Provision of prescription statistics to the provincial department of health e.g. prescribing patterns, drug utilisation and costs, demographic distribution of diseases and corresponding use of medicine etc.

## **2.10. Concept of pharmaceutical care**

Pharmaceutical care is defined by Helper (1988) as “a covenantal relationship between a patient and a pharmacist in which a pharmacist performs drug use control functions (with appropriate knowledge and skill) governed by the awareness of and commitment to the patient’s interest.” In 1990 Helper and Strand further defined pharmaceutical care as “a component of pharmacy practice which entails the direct interaction of the pharmacist with the patient for the purpose of caring for the patient’s drug related needs.” From the definitions it is evident that the foundation of pharmaceutical care is based on relationships between the patient and the pharmacist. The process of pharmaceutical care entails the following in chronological order (Pharmaceutical care 1997):

- reviewing all medications the patient is currently taking
- linking each medication to an appropriate indication
- identifying actual or potential drug therapy problems
- resolving and/or preventing drug therapy problems
- establishing a care plan with the patient to achieve desired therapeutic goals for each medical condition and drug therapy problem, and plan for follow-up evaluation
- following up with the patient to evaluate actual patient outcomes and status of the patient's medical conditions and
- documenting above elements in a readily retrievable way.

Although the concept of pharmaceutical care has been known to the pharmacy profession for several years its implementation has proved to be a challenge to most pharmacists for a variety of reasons. Pharmacists are often short-staffed and very busy consequently focusing only on 'dispensing'. Dispensing in this context is the traditional approach whereby the pharmacist receives the prescription from the patient and gives the correct patient the correct drugs as per script with very little, if any, emphasis given to the appropriateness of the medication, potential drug-drug interactions, alternative dosage forms which will improve compliance and developing an individualised care plan for the patient (Sakthong 2007). The pharmacists perceive that they do not have the time to perform most of the above mentioned elements of pharmaceutical care. In a study by Uema *et al* (2008) to identify the barriers for providing pharmaceutical care; lack of time, lack of specific training and lack of communication skills were cited as reasons for not implementing pharmaceutical care. In another study of New Zealand pharmacists; lack of therapeutic knowledge, clinical problem solving skills, finance, appropriate space, patient demand and access to patient medical records were identified as major barriers by over 50% of respondents (Dunlop and Shaw 2002). Another barrier to providing pharmaceutical care is a lack of understanding of the process of pharmaceutical care by the pharmacists and inability to correctly differentiate between the traditional role of dispensing and pharmaceutical care (Sakthong 2007).

In addition to being busy, the perceived role of pharmacists by patients and the health care team hinders pharmacists from providing pharmaceutical care. There is a low expectation of the pharmacy profession with pharmacists being seen as 'shopkeepers' by the community as they are supposed to simply hand them their medication (Sakthong 2007). Patients rely on their doctors for all their health needs including drug-related needs. In a study to investigate the provision of pharmaceutical care by community pharmacists across Europe, Hughes *et al* concluded that the provision of pharmaceutical care is still limited. In the study pharmacists were more engaged in general activities with less involvement in patient centred activities. It should be emphasised that pharmacists are not exclusively responsible for therapeutic outcomes, other healthcare professionals, including doctors and nurses, have valuable and well-established, well-recognised roles in the medication use process (ASHP 1993). The process of pharmaceutical care complements and neither duplicates nor threatens the roles of the other professionals in the health team. Pharmacists' core interest is in drug therapy therefore they should accept responsibility for all drug-related needs of the patient particularly given the costs associated with drug related morbidity and mortality (Dunlop and Shaw 2002). The occurrence of adverse drug events significantly prolongs the length of hospital stay and increases costs as well as mortality (Classen *et al* 1997).

A study on hypertensive patients in Nigeria proved that provision of pharmaceutical care can improve blood pressure control and treatment outcomes (Erhun *et al* 2005). The results were consistent to that of a hypertensive population in Brazil where the provision of pharmaceutical care by pharmacists increased the understanding of the disease, early recognition of adverse effects of the medication and increased adherence to the medication (Silveria de Castro *et al* 2006). Although there has been relative consistency in the literature regarding the positive implications on health outcomes by providing comprehensive pharmaceutical care, some studies have shown no improvement in patient quality of life and/or treatment outcomes after provision of pharmaceutical care (Roughead *et al* 2005).

Chronic patients are particularly important as they can have co-morbid disease states and are taking many drugs. With the successful implementation of the CDU, the concept of pharmaceutical care can become a reality in the public health sector as pharmacists can potentially spend more time with the patients addressing their drug related needs.

## **2.11. Conclusion**

There is consensus that the global burden of chronic diseases and the rates of mortality and morbidity caused by chronic disease are alarming and there is a need for interventions to reduce the impact of chronic diseases. Patients are ultimate decision makers on factors which could have either positive or negative impacts on their health hence empowering patients with the knowledge and means to manage their condition could be an efficient way of improving treatment outcomes. Reducing the disease burden not only impacts on households but on the community, employers and the country.

Service delivery has to be prioritised as this can lead to patients who are content and satisfied thereby increasing medication adherence and potentially improvement in treatment outcomes. Since health workers are the ones who provide the service, efforts to increase their level of satisfaction should be made. The Western Cape department of health aims to improve service delivery by contracting out the process of chronic medication dispensing. Pharmacists are placed in a position which will enable them to provide pharmaceutical care to chronic patients. By providing pharmaceutical care, patient provider relationships are built which will allow patients to manage their health.

Several studies have been published which investigate the areas highlighted in this study. However there has been a limited scope of research in this area in the South African context. The level of provision and benefits of providing pharmaceutical care in South Africa was unclear. There is published literature on the perceived benefits and operation of the CDU but there has been no literature on studies conducted to assess the real impact that the

CDU has had. There was also limited South African based research on health worker and patient satisfaction.

Given the burden of disease and the current and projected financial burden of chronic diseases in South Africa, this study explores the implications on chronic patients, pharmacists and the state of improving service delivery by contracting out the process of chronic medication dispensing for state facilities. It is hoped that the results from the study assist relevant stakeholders on determining the expansion of the project to other provinces.

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## ***PART 3: MANUSCRIPT OF AN ARTICLE FOR A PEER-REVIEWED JOURNAL***

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### **Implications of the centralised chronic dispensing unit in the Western Cape Province, South Africa**

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#### **Abstract**

**Objectives:** The objective of the study was to assess if the chronic dispensing unit (CDU) has reduced patient waiting times when collecting chronic medication at public health facilities in South Africa and the financial implications on patients and the Department of Health. The impact of the implementation of CDU on pharmacist job satisfaction was also determined.

**Methods:** Face to face semi-structured interviews were conducted with 168 chronic patients at four community health centres (CHCs) in the Western Cape Metropole. Four pharmacists and the manager of the CDU were also interviewed.

**Key findings:** Before the CDU, none of the patients waited less than 2 hours to collect medication. A significant reduction in waiting times was noted with 91.3% of the patients who waited for 2-3 hours now waiting for less than an hour. With the introduction of the CDU, 64.39% respondents wait for less than an hour, 14.39% for 1-2hours, 12.88% for 2-3hours, 5.30% for 3-4hours, 1.52% for 4-5hours and 5-6 hours. The CHCs have implemented the dispensing process of pre-packed medication differently resulting in different waiting times for each facility. A total of 62.5% of employed patients no longer take a day off to collect medication. Job satisfaction of pharmacists improved although the workload did not decrease as anticipated.

**Conclusions:** The study has shown that waiting times for patients collecting chronic medication from public sector facilities has been reduced to different extents with positive economic implications on households, employers and consequently the macroeconomy. Although the CDU has been successfully implemented in the Western Cape Metropole the capacity and the structures at the CHCs need to be improved so as to maximise the benefits of the centralised dispensing of chronic medication.

**Keywords:** Chronic dispensing unit (CDU), centralised dispensing, waiting time, South Africa

## Introduction

According to the World Health Organisation (WHO), chronic diseases are the leading cause of mortality and with approximately 60% of deaths in 2005 being attributed to chronic diseases (WHO 2008) with 80% occurring in low to middle income countries (Westaway 2010). South Africa is among the 23 developing countries which contributed 80% of the mortality burden from chronic diseases in 2005 (Abegunde *et al* 2007). A projected 41 million of deaths will be due to chronic diseases in 2015 without sustained preventive or treatment interventions (Abegunde *et al* 2007).

Westaway (2010) conducted a study to determine the prevalence of chronic diseases in an urban area in South Africa and found that 73% of respondents had at least one chronic disease with the majority being dependent on the public health sector. This high reliance of chronic patients on the public sector is of concern with the challenges facing the public health sector which include inadequate health workers, lack of motivation among workers and patient overload at facilities (Mayosi *et al* 2009).

In addition to the disease burden, chronic diseases can also impose financial burdens on patients, families and communities, healthcare systems and governments. With the rising disease burden of chronic diseases, low and middle income countries are the most affected and these are the countries which already have limited health care resources and cannot afford a “health-related setback to economic development” (Abegunde *et al* 2007). The macroeconomy is negatively impacted by loss of labour due to deaths or morbidity and the costs of treating chronic patients (Abegunde *et al* 2007). Should the global goal of decreasing chronic diseases by 2% be met, USD8 billion lost from income would be saved collectively in the 23 countries which is almost 10% of projected lost earnings (Abegunde *et al* 2007). Given the financial impact chronic diseases have, the government should therefore engage in interventions which improve treatment outcome and increase awareness of risk factors through health promotion and campaigns. Screening tests should be prioritised and carried out on a frequent basis depending on the risk factors as some of the diseases when treated early will have a more positive prognosis thereby lowering treatment and other related costs.

With chronic diseases affecting people during their economic productive capacity years, there is a reduction in productive labour and earning capacity at the household level (Abegunde *et al*, 2007). Healthier people are more likely to produce more output compared to their unhealthy counterparts (Suhrcke *et al* 2006). It is therefore to the best interest of the economy of the nation for the government to strive towards achieving the global goal of reducing chronic diseases by 2%.

One aspect of managing chronic patients is ensuring convenience on the collection of monthly medication. In South Africa, chronic medication can be collected at hospitals or in community health centres (CHCs). The logistics involved in dispensing chronic medication is not very efficient hence patients wait in long queues to collect their medication. With the staff shortages and long queues at the dispensary, the pharmacists do not have sufficient time to address the health needs of patients. Inadequate management of chronic patients results in increased complications which lead to an acceleration in hospitalisations and increased emergency visits (Steyn *et al* 2008).

A new model for dispensing chronic medication was developed in 2005 in the Western Cape. The model is characterised by a centralised dispensing system whereby chronic medication for patients whose condition is under control is dispensed at a central unit and then sent out as individual pre-packed parcels to the CHC for patient collection. This system has been successfully rolled out in the Western Cape Metropole region. As the patients experience improved treatment outcomes and reduced waiting times, significant direct and indirect cost savings by patients are expected.

The study aims to determine the financial impact the new centralised dispensing of chronic medication system has on both households and the Western Cape provincial Department of Health, and the level of patient and health worker satisfaction the system has introduced. Analysing the economic benefit will aid the decision makers in allocation of resources for chronic disease management and can aid in decisions on expansion of the centralised dispensing system to other provinces and other areas in the Western Cape.

## **Methods**

The study design was cross-sectional. 168 chronic patients from four CHCs currently receiving pre-packed monthly medicines from the Centralised Dispensing Unit (CDU) in different geographical areas in the Cape Town Metropole were randomly selected for participation. Of the 168 patients, 132 were receiving their chronic medication directly from the CDU and 36 patients were collecting their medication directly from the CHC pharmacy. These 36 patients are monitored by the doctor on a monthly basis, and they were used as a control.

Upon receiving written consent, a semi-structured face to face interview was voluntarily conducted with each participant. Interviews were conducted over a 5 week period at the facility as patients waited to collect their medication. In order to ensure consistency, the interviewers conducted interviews starting at 7.30a.m. until 1.00p.m. with some facilities having to extend interview hours to 3.00p.m. The respondents had to be the patients or

directly related to the patient so that they could answer all the questions. For those collecting from the CDU, they had to have collected their pre-packed medicine for at least two months to meet the inclusion criteria.

An in depth interview was conducted with the manager of the CDU. The interview was recorded and transcribed with field notes taken during the interview. Semi-structured interviews were conducted with three pharmacists at three of the four CHC. An informal interview was conducted with the fourth pharmacist due to lack of a convenient time to schedule a formal interview. Interviews with pharmacists were done to assess whether the CDU system had impacted on job satisfaction and service delivery.

Participants gave written informed consent prior to participating and confidentiality was assured. Patients were also guaranteed that the level of care they receive will not be compromised by the responses they give and that they would not be linked to their responses in any way as no names were written on the questionnaire. Ethical approval was obtained from the University of Cape Town Ethics Committee. Written consent was also obtained from the Western Cape provincial department of health. The study had no risks or direct benefits to the participants.

Data was analysed both quantitatively and qualitatively. Quantitative data was coded and analysed using STATA. Statistical significance was analysed using Stuart-Maxwell and chi-squared tests.

## **Results**

A total of 235 patients were asked to participate in the study, with 200 indicating a willingness to participate and 168 successfully completed the interview (36 controls and 132 who are receiving their chronic medication from the CDU) giving a response rate of 71.50%. Of the respondents, 52.27% who received their medication through the CDU had been collecting medication at the particular CHC for at least 3 years with patients having collected medication at the same facility for up to 20 years. Demographic analysis of the respondents is shown in table 1 below.

	% respondents intervention (n)	% respondents control (n)
<b>Age</b>		
<21 years	0	2.78(1)
21-30 years	6.82 (9)	13.89(5)
31-40 years	10.61 (14)	8.33(3)
41-50 years	17.42 (23)	27.78(10)
51-60 years	29.55 (39)	25.00(9)
61-70 years	20.45 (27)	13.89(5)
> 70 years	15.15 (20)	8.33(3)
<b>Gender</b>		
Male	33.33 (44)	36.11(13)
Female	66.67(88)	63.89(23)
<b>Racial classification</b>		
Black	9.09 (12)	22.22(8)
Coloured	63.64(84)	77.78(28)
Asian	7.58(10)	0
White	19.70(26)	0
<b>Employment status</b>		
Unemployed	53.79 (71)	55.56(20)
Employed	28.79 (38)	25.00(9)
Pensioner	17.42 (23)	16.67(6)
Student	0	2.78(1)
<b>Total household income</b>		
<R2,000	35.48(33)	52.00(13)
R2,001-R5,000	19.35(18)	28.00 (7)
R5,001-R10,000	32.26(30)	16.00 (4)
R10,000-R15,000	8.60 (8)	4.00(1)
> R15,000	4.30(4)	0
Disability grant	11.36(15)	30.56(11)
<b>Level of education</b>		
Lower than matric	71.97(95)	77.78 (28)
Matric	19.70(26)	16.67 (6)
Tertiary	8.33(11)	5.56 (2)

**Table 3.1: Demographic characteristics of participants.**

For patients in the intervention group, 50.76% had at least one dependant with the maximum number of dependants being 9. In the control group, 30.56% had at least one dependant with a maximum of 6. The ages of dependants ranged from less than 5 years to more than 10 years. There were no drastic changes in childminders used while patients went to collect their medication before and after the introduction of the CDU. Number of respondents who brought their dependants increased by 6.06%.

In the intervention group, 56.82% had only one chronic disease with the remainder having at least two chronic diseases. Cardiovascular diseases were ranked highest with 49.25 % of respondents suffering from at least one form of cardiovascular disease. 1.99% reported to have cancer, 5.97% had chronic respiratory disease, 21.89% had diabetes and 20.90% suffered from any other chronic disease and this included hypo/hyperthyroidism and blood disorders. In the control group, 51.06% indicating that they had a form of cardiovascular disease.

Of the patients who collected their medication from the CDU, 42.42% knew all names of the medication they were taking with 36.36% saying either “ *I don't know.*” or “*I don't remember.*” and the remainder knowing some but not all names of the drugs they were taking. In the control group, 38.89% knew the names of all the medication they were taking. Of the respondents who were receiving their medication through the CDU, 65.15% had seen a change in the management of their condition with the introduction of the service with the other 34.85% saying there has been no remarkable change. In both groups, the pharmacists were offering comprehensive pharmaceutical care services to different extents to 85.61% and 97.22% of the respondents in the intervention group and control group respectively. When pharmacists were asked if they offer comprehensive pharmaceutical care services to the chronic patients their responses were:

***“The nurses do it. We just tell them how to take their medication.”***

***“...only if there is a change in medication....”***

***“...we try but mostly we just reaffirm how they take their medication.”***

Prior to the implementation of the CDU none of the patients at the four centres waited for less than 2 hours to collect their medication. After performing the Stuart-Maxwell test ( $p=0.0000$ ), we found that the introduction of the CDU had shown statistically significant reduction in waiting times. Table 2 below shows a detailed description of the shift of patients from a longer waiting time to a shorter one. As an example, of the 17.42% patients ( $n=132$ ) who waited for 2-3 hours prior to introduction of CDU, 91.30% ( $n=23$ ) now waited for less than an hour. A total of 64.39% ( $n=132$ ) waited for less than an hour and 1.52% for 4-5hours and 5-6 hours with the introduction of the CDU. From the participants who were not collecting their medication from the CDU ( $n=36$ ), only 2.78% waited for less than an hour compared to 64.39% in the intervention group. Majority of the patients in the control group (33.33%) waited for 2-3hours to collect their medication with 16.67% waiting 4-5hours. Pharmacists commented that with the new system they dispense medication for 50-

70patients/hour which is more than half of the volumes they dispensed prior to CDU implementation.

**Key for all tables:**

Frequency
Row percentage
Column percentage

Waiting time to collect medication before CDU	Waiting time to collect medication after CDU						
	<1hr	1-2hrs	2-3hrs	3-4hrs	4-5hrs	5-6hrs	Total
<1hr	0	0	0	0	0	0	0
1-2hrs	0	0	0	0	0	0	0
2-3hrs	21	1	1	0	0	0	23
	91.30	4.35	4.35	0.00	0.00	0.00	100.00
	24.71	5.26	5.88	0.00	0.00	0.00	17.42
3-4hrs	31	7	5	2	0	0	45
	68.89	15.56	11.11	4.44	0.00	0.00	100.00
	36.47	36.84	29.41	28.57	0.00	0.00	34.09
4-5hrs	16	5	4	2	0	0	27
	59.26	18.52	14.81	7.41	0.00	0.00	100.00
	18.82	26.32	23.53	28.57	0.00	0.00	20.45
5-6hrs	8	3	0	1	0	0	12
	66.67	25.00	0.00	8.33	0.00	0.00	100.00
	9.41	15.79	0.00	14.29	0.00	0.00	9.09
6hrs+	9	3	7	2	2	2	25
	36.00	12.00	28.00	8.00	8.00	8.00	100.00
	10.59	15.79	41.18	28.57	100.00	100.00	18.94
Total	85	19	17	7	2	2	132
	64.39	14.39	12.88	5.30	1.52	1.52	100.00
	100.00	100.00	100.00	100.00	100.00	100.00	100.00

**Table 3.2: Waiting times before and after the introduction of the CDU (n=132).**

Waiting times were different for the facilities with long waiting times being more specific for one CHC and patients expressed mixed emotions on waiting as shown below:

***“On introducing it was 30mins. They should speed up! It comes from Tygerberg already packed .....but then again it’s a day hospital therefore we should bring picnic baskets and spend the day here.”***



***“Even though I have to wait, I am very happy seeing that I don’t pay. Beggars can’t be choosers.”***

***“You need to be patient, can’t get excited when u come here although the waiting can be too much.”***

As mentioned earlier, 28.78% of the respondents were employed. Of those who were employed, 84.21% (n=38) previously took a day off to collect their medication and with the introduction of the CDU, 62.50% no longer take a day off to collect their medication as the waiting time is shorter. The impact of the CDU on the employed workers regarding not requiring a day off is statistically significant ( $p=0.0000$ ) and is tabulated below in table 3.

Day off to collect medication before CDU	Day off to collect medication after CDU		
	NO	YES	TOTAL
NO	6	0	6
	100.00	0.00	100.00
	23.08	0.00	15.79
YES	20	12	32
	62.50	37.50	100.00
	76.92	100.00	84.21
TOTAL	26	12	38
	68.42	31.58	100.00
	100.00	100.00	100.00

**Table 3.3: Day off to collect medication before and after the introduction of CDU (n=132).**

The financial impact of an off day differed from one individual to another as it depended on the type of day off which were categorised as sick leave, leave without pay or day off between shifts. A tremendous shift was noticed with the employed patients who took leave without pay as 77.78% of these respondents no longer take an off day. Table 4 below shows the shift of patients after the introduction of the CDU. For instance, 39.47% (n=38) of the respondents took sick leave when they had to collect their medication but with the introduction of the CDU, 53.33% of those who took sick leave do not take a day off as they can collect their medication and still go to work.

Type of day off before CDU	Type of day off after CDU					
	Not day off	Sick leave	Leave without pay	Self-employed	Day off between shifts	TOTAL
Not day off	5	0	0	0	0	5
	100.00	0.00	0.00	0.00	0.00	100.00
	20.83	0.00	0.00	0.00	0.00	13.16
Sick leave	8	7	0	0	0	15
	53.33	46.67	0.00	0.00	0.00	100.00
	33.33	87.50	0.00	0.00	0.00	39.47
Leave without pay	7	1	1	0	0	9
	77.78	11.11	11.11	0.00	0.00	100.00
	29.17	12.50	100.00	0.00	0.00	23.68
Self-employed	1	0	0	1	0	2
	50.00	0.00	0.00	50.00	0.00	100.00
	4.17	0.00	0.00	100.00	0.00	5.26
Day off between shifts	3	0	0	0	4	7
	42.86	0.00	0.00	0.00	57.14	100.00
	12.50	0.00	0.00	0.00	100.00	18.42
TOTAL	24	8	1	1	4	38
	63.16	21.05	2.63	2.63	10.53	100.00

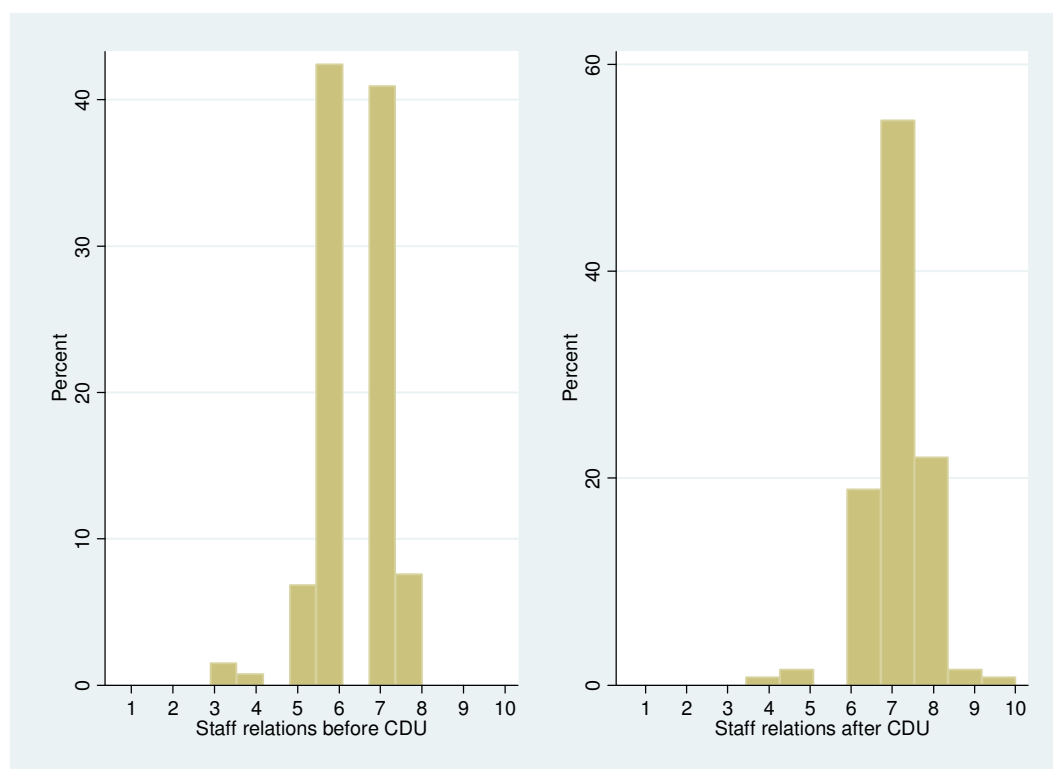
**Table 3.4: Type of day off taken before and after the introduction of the CDU (n=38).**

On comparison of those receiving medication from CDU to those who are not, 30.77% took a day off compared to 91.67% respectively. The control group had a 50%-50% distribution of patients who would lose a days income from having to collect their medication from the health centre and those who did not. Of the patients who received medication from CDU only 14.29% lost income on the day of collecting medication.

On conducting interviews, it became apparent that some of the patients paid people in the community to collect the medication on their behalf and the patients would only go to the health centre every 6 months when they had to see the doctor. There was an increase in third party payments from 6.82% (n=132) before the CDU to 17.65% after the CDU. Payments ranged from R10 to R30.

The respondents rated their relationship with the staff on a scale of 1-10 with 1 being the worst and 10 being the best and there was a statistically significant improvement ( $p=0.0000$ ) in staff relations before and after the introduction of the CDU with a mean of 6.43 and 7.03 respectively. Figure 1 below shows the rating of staff relations before and after the CDU was implemented. The controls had a mean score of 6.47 of their relationships with the staff.

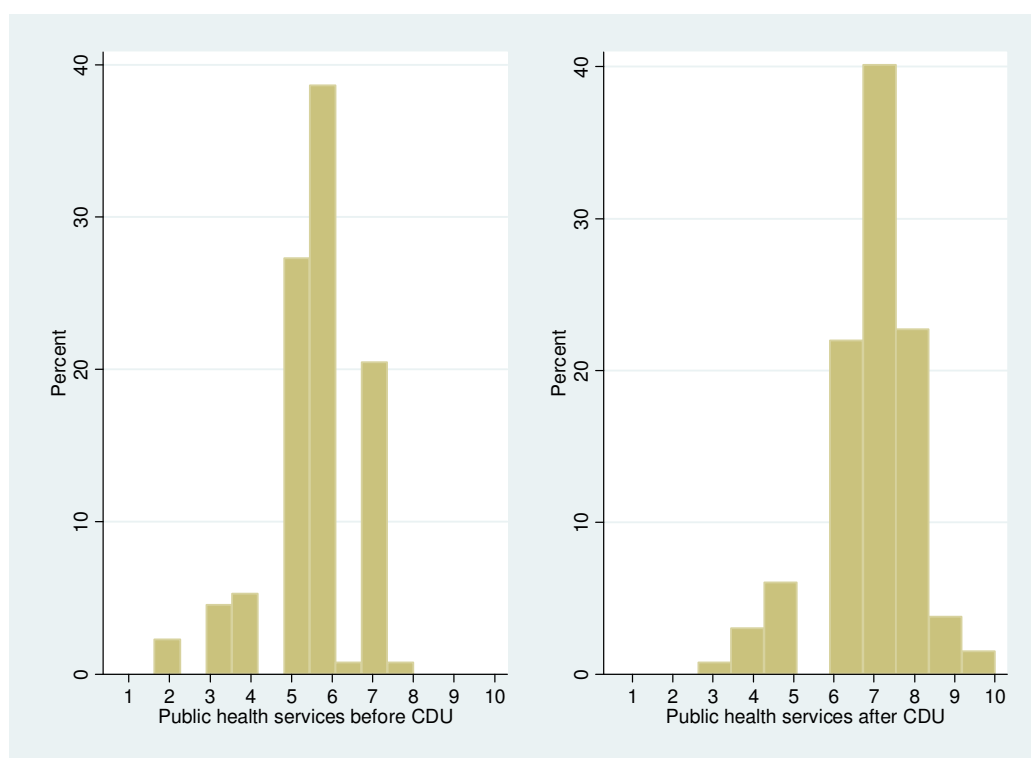
Pharmacists also noted that patients appeared happier and there were improved relations between the dispensing staff and patients.



**Figure 3.1: Rating of staff relations before and after CDU implementation (n=132)**

Pharmacist rated their satisfaction with the CDU from satisfied to very satisfied. There was consensus among the pharmacists that the pressure has shifted from dispensing to managerial and administration resulting in pharmacists being busier. With the introduction of the CDU, pharmacists commented that the patient base has increased without an increase in dispensary staff so patients waited longer than when the service was initially implemented. The pharmacists also added that the CDU is frequently out of stock of some of the drugs.

On rating public health services on a scale of 1-10, there was a statistically significant improvement from a mean score of 5.62 to 6.87 before and after the CDU respectively. Figure 2 below shows the trend in the rating of public health facilities. The participants who collected their medication directly from the CHC rated the public health services at 5.53.



**Figure 3.2: Rating of public health services before and after CDU implementation (n=132)**

Before the implementation of the CDU, 39.39% (n=132) of the respondents did not incur any transport costs. These respondents walked to the community health centre with the remainder, 60.61%, incurring a cost. This cost was through different modes of public transport or fuel consumption with private vehicles. The proportion of respondents who did not incur any transport costs did not change with the introduction of the CDU, however, 7.50% of the respondents who incurred transport cost of between R10-R29 before CDU did not have any costs after CDU. One of the patients said:

***“I am always the first one here and I am done in less than 10mins so my husband waits for me to pick up my medication yet before he would come back to fetch me.”***

There was a statistically significant ( $p=0.01$ ) shift of patients to spending less on transport with the introduction of the CDU for those spending more than South African Rand (R)10 as shown in table 5 below.<sup>1</sup>

<sup>1</sup> At the time of the study the exchange rate was USD1=R7.06

Transport costs before CDU	Transport costs after CDU						
	No cost	<R10	R10-R19	R20-R29	R30-R39	>R50	Total
No cost	52	0	0	0	0	0	52
	100.00	0.00	0.00	0.00	0.00	0.00	0.00
	89.66	0.00	0.00	0.00	0.00	0.00	0.00
<R10	0.00	9	0.00	0.00	0.00	0.00	9
	0.00	100.00	0.00	0.00	0.00	0.00	100.00
	0.00	75.00	0.00	0.00	0.00	0.00	6.82
R10-R19	4	1	33	0.00	0.00	0.00	38
	10.53	2.63	86.84	0.00	0.00	0.00	100.00
	6.90	8.33	86.84	0.00	0.00	0.00	28.79
R20-R29	2	2	3	13	0	0	20
	10.00	10.00	15.00	65.00	0.00	0.00	100.00
	3.45	16.67	7.89	81.25	0.00	0.00	15.15
R30-R39	0	0	2	1	5	0	8
	0.00	0.00	25.00	12.50	62.50	0.00	100.00
	0.00	0.00	5.26	5.26	83.33	0.00	6.06
R40-R49	0.00	0.00	0.00	2	0.00	0.00	2
	0.00	0.00	0.00	100.00	0.00	0.00	100.00
	0.00	0.00	0.00	12.50	0.00	0.00	1.52
>R50	0.00	0.00	0.00	0.00	1	2	3
	0.00	0.00	0.00	0.00	33.33	66.67	100.00
	0.00	0.00	0.00	0.00	16.67	100.00	2.27
TOTAL	58	12	38	16	6	2	132
	43.94	9.09	28.79	12.12	4.55	1.52	100.00
	100.00	100.00	100.00	100.00	100.00	100.00	100.00

**Table 3.5: Transport costs before and after the implementation of CDU (n=132) in 2010**  
**Rand**

The CDU manager pointed out that the province has benefited from the CDU as a monthly report is sent out summarising the dispensed medication, average cost per prescription, age and gender distribution of diseases per CHC and corresponding prescriber behaviour.

## Discussion

Waiting times have been significantly reduced with the introduction of the CDU. This has been an incentive to patients to be compliant with their medication and to collect their monthly refills as they want the convenience of shorter waiting times. Should patients default, they will have to collect their medication directly from the CHC meaning longer waiting times. Although improved compliance to collecting medication does not necessarily

translate to improved adherence in taking the medication as prescribed since patients can get home and simply not take the medication, it can be assumed that there can be an improvement in adherence as the patients are more satisfied. As with Loong (1999) and Slowiak *et al* (2008) reduced waiting times increase patient satisfaction and increase compliance.

There is enough evidence to suggest that the CDU has had a positive impact financially for employed patients as patients can get back to work and thereby not losing on income and 77.78% do not need to take an off day. Not only does this impact on households but on the macroeconomy of the country as the effect on the level of productive labour has been improved. It is concerning though that some patients still take paid sick leave irrespective of the fact that they can potentially collect their medication and go to work as centres give preference to employed patients when collecting their medication.

The reduction in waiting times has made some patients bring their dependants with them as they know they will not wait for too long. When patients wait for too long there is a higher chance that they will spend money on refreshments. Reduced waiting could therefore have also positively impacted on spending patterns during the day spent at the CHC. On the contrary, there has been an increase in third party payments with patients only coming in when they have a doctor's appointment. This could be because of the traditional belief that the dispensing process takes long so patients have probably not been willing to collect their own medication for fear of waiting for too long.

However, the different CHCs have implemented the dispensing of pre-packed medication differently as patients are waiting up to 6 hours in some facilities. Pharmacists might need to consider having a meeting to share ideas on dispensing medication with patients not having to wait for too long, at the same time offering the best possible service.

Complaints from pharmacists about drug shortages are not a responsibility of the service provider as all drugs are provided by the state. Delivery of drugs at CHCs is not delayed and dispensing mistakes by the CDU personnel is said to have been greatly reduced. Despite that, 34.85% of the patients said there was no remarkable change in the management of their condition with the introduction on the CDU. Considering the extent of pharmaceutical care actually given to the patients, improvement in condition could be attributed to shorter waiting times which consequently result in patient satisfaction and increased compliance to medication. Should patients receive extensive comprehensive pharmaceutical care services, there would be significant improvement in treatment outcomes.

Patients are not well informed of their medication as 36.36% in the intervention group did not know the names of their medication. Chronic patients need to be given responsibility in managing their condition and this includes knowledge of their medication (Mayosi *et al* 2009; Berenson 2006). However, we should also bear in mind that the level of education of the patients could impact their ability to know and understand about their medication and in this population 71.97% and 77.78% in the intervention and control group respectively had not attained matric.<sup>2</sup>

The idea of pharmaceutical care is not fully understood and practiced. Since waiting times are shorter, it would be expected that more time would be spent with patients ensuring that their condition is being managed appropriately. However, this is not being done in practice as medication is simply handed out to patients and since most patients have been taking their medication for a long time, they do not pay full attention when the pharmacist tells them how to take their medication. Two reasons were noted for this behaviour by pharmacists and patients. Firstly, pharmacists are under staffed, so reduced waiting times does not imply that they spend more time with patients but rather that they have more time to carry out other duties expected from them. As mentioned by pharmacists, there is now more administration work to be done. On the other hand, patients do not expect pharmacists to practice pharmaceutical care. This could be because patients perceive pharmacists to be responsible only for handing out their medication with any other medication related queries being handled by their doctors. Pharmacists will need to reinforce their profession by taking responsibility of medicine related queries and treatment outcomes of their patients without duplicating the roles of any other health profession.

Capacity at CHCs needs to be increased for the full benefits of the CDU to be maximised. With more and more patients being recruited to receive their medication through the CDU, waiting times of patients are now increasing and if capacity to cater for an increased number is not increased, eventually the benefits of the CDU will be nullified. Although the dispensing method is more efficient, the question that should also be addressed is whether there have been improved treatment outcomes. Responsibilities of dispensary staff should be delegated in a way that some duties that do not necessarily need the expertise of pharmacist are freed and done by other staff so that pharmacists can carry out roles that will have a definite impact on treatment outcomes of patients.

Information provided to the DOH, was previously not available as the facilities do not have an electronic system of dispensing. Precise information is now available which has financial

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<sup>2</sup> Matric refers to high school education.

benefits for the province. Given the costs of medicines and the prescriber patterns, the DOH can assess if the prescribing patterns is in accordance with the guidelines. Comparison of medicines costs per condition can be ascertained and comparisons can be made between the different provinces. The DOH can also make more accurate budget allocations for pharmaceuticals used at different CHCs.

### ***Strengths and limitations***

Interviews were conducted at the same times every day to ensure some form of consistency as the experiences of patients might differ at different times of the day. The researchers recruited CHCs in four different geographical areas however interviews were done at only four of the CHC receiving the service so results cannot be generalised. More CHCs would need to be recruited for more conclusive results. In addition only 36 patients were used for comparison due to difficulty in recruiting these patients and time constraints therefore more controls would be needed for a better comparison.

Interviews were done with people from a low socioeconomic status who are dependent on the public sector for service provision and cannot afford to seek healthcare from the private sector. This could have resulted in biased results as the patients might have the perception that if they complain or discredit the public sector it will be to their disadvantage. Using monetary value to determine the financial impact of CDU on childminders might have limited the findings as the community might engage in other forms of appreciation which are not necessarily monetary.

Another limitation of the study is recall bias as patients had to recall how long they waited prior to implementation of CDU. The elderly participants might also have found it difficult to reflect on past events. There was also limited literature in the South African context as this is the first study examining the implications of the CDU.

### **Conclusion**

There has been a definite significant reduction in waiting times with positive financial implications on both employed and unemployed households. Employed chronic patients do not necessarily have to take an off day or pay a third party to collect medication as the process is now faster. Patients also save on transport as their family can wait for them while they collect their medication instead of dropping them off and picking them up later. The DOH can also present more accurate financial pharmaceutical budgets and thereby plan their spending in a more logical way as they have accurate cost data. Both patients and pharmacists have expressed satisfaction with introduction of CDU. However, capacity to cater for increased number of patients on the CDU needs to be adjusted accordingly to



enhance treatment outcomes. The overall goal of the CDU should not only be to decrease waiting times but also to improve treatment of chronic diseases and thereby avert deaths from chronic diseases.

### **Conflict of interest**

The author declares no conflict of interest.

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## ***PART 4: POLICY BRIEF***

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### **Implications of the centralised chronic dispensing unit in the Western Cape Province, South Africa**

#### **4.1. Background**

South Africa is characterised by a quadruple burden of infectious (HIV and TB), chronic diseases (diabetes, cancer, cardiovascular), perinatal and maternal, and injury related disorders (violence and motor accidents) (Mayosi *et al* 2009). According to the WHO estimates of the burden of disease in South Africa in 2004, chronic diseases resulted in 28% of the total burden of disease measured by disability-adjusted life years (DALYs) (WHO 2008). As the burden of chronic diseases increases in South Africa, morbidity will also increase with an estimated R4.2 billion being projected to be spent on national disability grants annually by 2040 (Househam 2010). Chronic diseases can also impose financial burdens on households, communities, employers and governments.

In South Africa, healthcare is provided by both the public and private sector with less than 20% of the population utilising the private sector. The public sector which is funded mainly through taxes is over-utilised and under-resourced (Wadee *et al* 2004). Like most developing countries, South Africa is characterised by an exodus of health workers with the distribution of the remaining health workers being biased towards the private sector. This results in an increase in work load of public sector health workers, leading to a decrease in job satisfaction and ultimately poor relations with patients which negatively affect treatment outcomes.

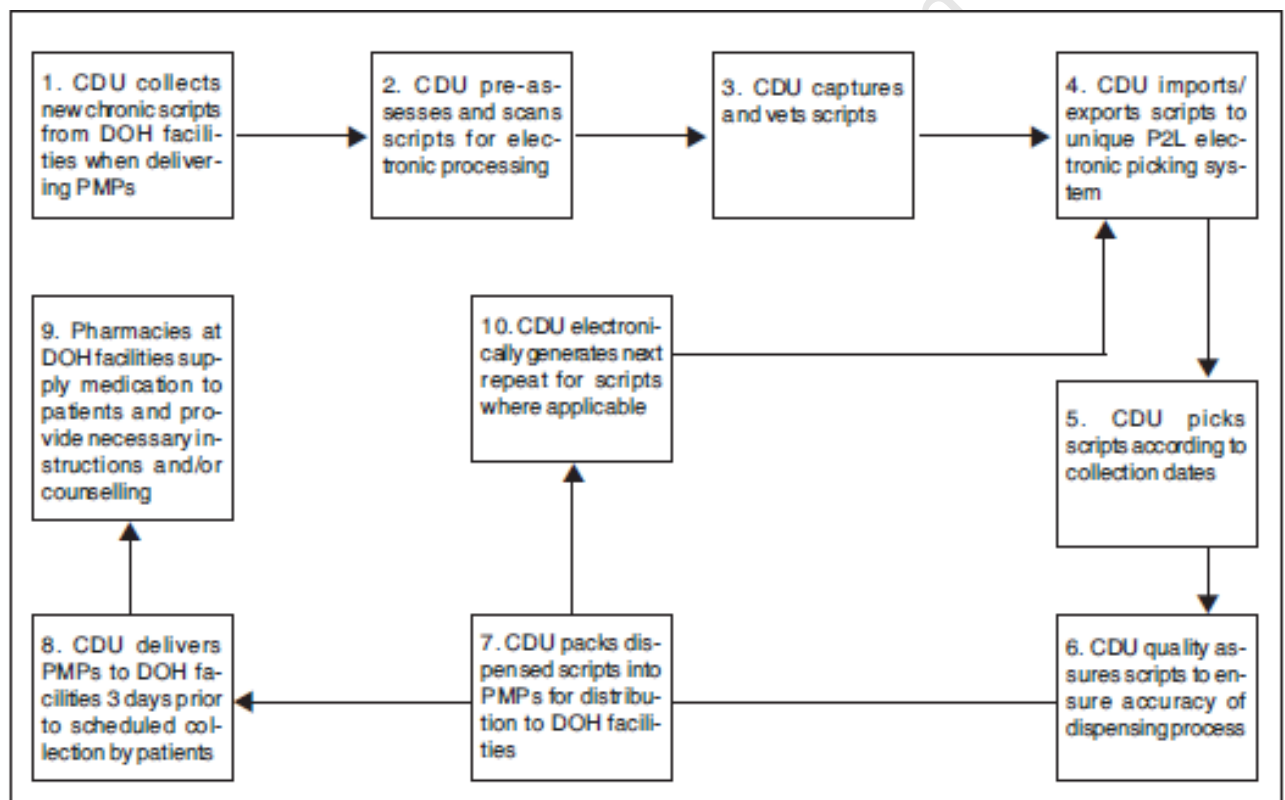
Post-apartheid, the South African government started increasing accessibility to health care services by providing free maternal and child healthcare which later extended to include free Primary Health Care (PHC) services at public health facilities and the provision of social welfare grants to those who are disadvantaged (Government communications 2008). PHC is well positioned for the management of chronic patients as most interventions for chronic care management are at a primary level and if effectively delivered the higher levels of care will benefit as they will be less admissions and complications due to chronic diseases. In the speech to present the health budget for 2010/11, the health minister specifically mentioned that the government will be working towards 'improving health systems effectiveness by strengthening Primary Health Care and reducing the costs of health' (Motsoaledi 2010).

The process of collecting chronic medication has been a challenge for most public sector institutions with chronically ill patients queuing for their monthly medicines from dawn until

sunset. The bottlenecks at pharmacies require most patients to sacrifice their day in order to collect their monthly medicines. In an attempt to decrease waiting times, Western Cape Provincial Department of Health (DOH), contracted out a service to a private sector pharmaceutical company, IPM (Pty) Ltd in 2005 to dispense chronic medication at a central institute and then delivering pre-packed individual packages for patients to collect at the DOH facilities which include CHCs, old age homes, clinics and some hospitals.

#### 4.1.1. The concept of centralised dispensing

The dispensing of chronic medication takes place at the Chronic Dispensing Unit (CDU). The CDU receives prescriptions from CHCs, prepares individually packed tamper proof parcels which are identified with outer labels and sends them back to the DOH facility for distribution. The flow diagram in figure 1 below shows the simplified process of centralised dispensing.



P2L – Pick to light; PMP- Patient Medicine Parcel; CDU- Chronic Dispensing Unit; DOH- Department of Health

**Figure 4.1: Work flow in the CDU model (du Toit 2008).**

## 4.2. Objectives

The research aims to determine the implications of the CDU by reducing patient waiting times and the perceived level of satisfaction of the service by patients and pharmacist.

### 4.3. Methodology

Face to face interviews were conducted with 168 patients and four pharmacists from four CHCs currently receiving chronic medication from the CDU. The provincial manager of the CDU was also interviewed.

### 4.4. Key findings

The following key findings were identified:

- Waiting times significantly reduced with 64.39% of patients waiting for less than an hour when collecting their chronic medication. For a detailed shift in patient waiting times see table 1 below.

**Key:**

Frequency
Row percentage
Column percentage

Waiting time to collect medication before CDU	Waiting time to collect medication after CDU						
	<1hr	1-2hrs	2-3hrs	3-4hrs	4-5hrs	5-6hrs	Total
<1hr	0	0	0	0	0	0	0
1-2hrs	0	0	0	0	0	0	0
2-3hrs	21	1	1	0	0	0	23
	91.30	4.35	4.35	0.00	0.00	0.00	100.00
	24.71	5.26	5.88	0.00	0.00	0.00	17.42
3-4hrs	31	7	5	2	0	0	45
	68.89	15.56	11.11	4.44	0.00	0.00	100.00
	36.47	36.84	29.41	28.57	0.00	0.00	34.09
4-5hrs	16	5	4	2	0	0	27
	59.26	18.52	14.81	7.41	0.00	0.00	100.00
	18.82	26.32	23.53	28.57	0.00	0.00	20.45
5-6hrs	8	3	0	1	0	0	12
	66.67	25.00	0.00	8.33	0.00	0.00	100.00
	9.41	15.79	0.00	14.29	0.00	0.00	9.09
6hrs+	9	3	7	2	2	2	25
	36.00	12.00	28.00	8.00	8.00	8.00	100.00
	10.59	15.79	41.18	28.57	100.00	100.00	18.94
Total	85	19	17	7	2	2	132
	64.39	14.39	12.88	5.30	1.52	1.52	100.00
	100.00	100.00	100.00	100.00	100.00	100.00	100.00

**Table 4.1: Shift of patients waiting times when collecting chronic medication before and after CDU.**

- Transport costs were significantly reduced in patients who spent more than South African Rand (R)10 on transport when collecting their medication.
- Of those who were employed, 84.21% previously took a day off to collect their medication and with the introduction of the CDU, 62.50% no longer take a day off to collect their medication.
- Of the patients collecting their medication through the CDU, 65.15% had seen a change in the management of their condition with the other 34.85% saying there has been no remarkable change.
- From the patient perspective, there was a significant increase in the level of satisfaction with the public health services and an increase in rating of staff relations with patients.
- Pharmacists were generally satisfied with the CDU with improved job satisfaction portrayed. However, some areas of improvement were noted.
- Data and accurate statistical information regarding chronic medication usage patterns was now available for the DOH.

#### **4.5. Implications of centralising chronic medication dispensing**

As suggested by Cullinan (2006), externalities are one of the market failures in chronic diseases. This is because the impacts of chronic diseases extend far beyond the individual and they are also felt by the families, communities and the society. Therefore positive effects of centralising dispensing inevitably spill over to their families, communities and the macroeconomy.

Chronic patients who are dependent on the public sector benefit from the service as they are decrease in waiting times. The employed patients who previously took an off day can potentially collect their medication and still go to work as they can get first priority in collecting their medication when the CHC dispensary opens. This is of great significance to employees who took unpaid leave on the day of collecting their chronic medication. Given the low socioeconomic status of most patients who present at public facilities, they cannot afford to lose on a day's income. By improving the process of collecting chronic medication, the patients can increase their compliance and adherence to their medication thereby improving treatment outcomes.

The caregivers, families and community also derive some benefits from this service. Assuming that they will be improved treatment outcomes, which will translate to an improved quality of life of patients consequently reducing the need for extra care by other family

members. Families are not only responsible for caring for the chronic patients but in some instances they are also responsible for the patient's children. Improving efficiency to accessing chronic medication therefore decreases loss of productivity by families. In addition, there can be a reduction in catastrophic expenditures which impact on families due to chronic illnesses.

The pharmacists employed at the CHCs showed improved job satisfaction with the centralising of chronic medication dispensing. Improving the level of job satisfaction will not only improve service provision but might also lead to the retaining of public sector pharmacists. With the shortages of pharmacists this might be an advantage to the department of health.

Lack of automation of the dispensing process at DOH facilities has made it impossible to provide the DOH with accurate information on drug usage patterns. With the CDU, the system allows for data to be provided as required. This allows the DOH to make feasible budgets for dispensed chronic medication. Improving the method of collecting medication will increase compliance and treatment outcomes which will in turn potentially reduce expenditures due to complications, hospital admissions and/or emergency hospital visits as the diseases will be under control.

Employers of chronic patients could potentially benefit from the CDU. There will be a decrease in the rate of absenteeism as patients do not wait for long when collecting their medication and with improved management of chronic diseases, patients will generally experience a better quality of life. This could translate to an increase in productivity with the positive effects spilling over to the macroeconomy of the country.

Currently the provision of social grants contributes the largest portion of the budget, approximately 93% in the 2010/2011 financial year (Molewa 2010). Given that compliance will increase, there will be improvements in the morbidity of chronic patients which may decrease the proportion of those requiring disability grants. The R4.2billion projected to be spent on disability grants by 2040 for chronic patients might be significantly reduced.

#### **4.6. Recommendations**

***The concept of centralising chronic medication dispensing should be piloted and implemented in other provinces.*** The process of implementing and expanding the centralised dispensing unit can be a challenge to the stakeholders to differing extents in the

different provinces. With fewer resources and more people, provinces such as the Eastern Cape will face greater health challenges when compared to the wealthier provinces such as the Western Cape. Financial constraints might be a limiting factor and the process might be considered unaffordable. However the long term economic benefits may outweigh the current costs making it a worthwhile project to invest in. The benefits have been laid down already and reducing waiting times will not only be a step towards combating chronic diseases but in meeting the 5 year target of the new government. This intervention in the management of chronic diseases might eventually lead to decreased government spending due to complications, hospital admissions and flare ups of chronic diseases as the diseases will be under control. Should this be implemented successfully, future budget allocations to chronic diseases could decrease and funds can be made available to other contributors to the quadruple disease burden. Given that the disproportionate burden of chronic disease tends to fall on the poorest in society, government intervention in the management of chronic diseases will probably promote equity and prevent or reduce the catastrophic effects caused by chronic disease.

The official unemployment rate in South Africa stood at 25.3% in the second quarter of 2010, up from 21.9% in the last quarter of 2008 (Statistics South Africa 2010). South Africa is faced with high unemployment levels therefore expanding the CDU could create employment through the contracted private service provider. There is also a direct proportional relationship between unemployment, poverty, and quality of life. The high crime rates in the country are also attributed to the unemployment rate as committing crime is the only means of survival for some criminals. Whether or not the same service provider will be used to expand the service will be dependent on the DOH. The contract between the service provider and the DOH will also be a way of promoting and empowering local business investment opportunities in the country.

***Capacity at the state facilities receiving the medication from the CDU should be adjusted to maximise benefits of the project.*** From the study we found that introducing the CDU will increase the volumes of chronic patients presenting at CHCs and administrative work for pharmacists. It should be assured that the CHCs dispensaries will have enough capacity to cater for increased patients otherwise there will be no significant reduction in waiting times.

***The structure of management at the DOH, CHCs and CDU will determine the success of the project.*** The downside of a top-down approach should be considered. For a more successful project, a balance should be struck between a top-down and a bottom up

approach. Pharmacists are better informed of the dispensing process and how it can be improved through the CDU therefore including them in the planning process might result in valuable contributions which will maximise the benefits of the CDU. In addition, by consulting with pharmacists they will feel appreciated if they have some input in the planning process and this could add on to their perceived level of job satisfaction and quality of care transferred to patients.

***Benefits of the CDU should not only be evaluated by reduction in waiting times but by indicators which measure patient quality of life, mortality rates, rate of admission and the extent of pharmaceutical care provision.*** In theory centralising the dispensing of chronic medication is supposed to afford pharmacists the opportunity to spend more time counselling patients as they are freed from dispensing. For treatment outcomes to improve and mortality rates to decrease, it will take more than just decreasing the bottlenecks at the dispensary. Patients are faced with information asymmetry and imperfect information. If efficiently managed and implemented at the community level, pharmacists can hopefully have the time and opportunity to provide patients with sufficient information regarding their medication and lifestyle changes that patients might need to adopt for effective management of their condition. This is particularly important as some chronic diseases are regarded as 'lifestyle diseases' exacerbated by the consumption of 'unhealthy goods' for example diet, sedentary lifestyle and smoking. Provision of pharmaceutical care can however be transformed into reality if the pharmacists understand and are willing to implement the concept of pharmaceutical care.

***DOH should consider liaising with the ministry of social development to develop a system for collecting social grants which does not interfere with the day of collecting medication.*** Although the rationale behind centralised dispensing is to increase medication compliance, there are some aspects which will impose challenges on the patients. Some chronic patients are on disability grants which are collected as cash on a monthly basis. The day of collecting disability grant might coincide with chronic medication and preference will be given to what will be carrying the most weight at a point in time. Some patients might miss their medication collection day or have to pay a third party to collect their medication on their behalf thereby incurring an expense. For families with more than one member having a chronic disease, defaulting might be because one member can afford to make the trip to the CHC and will therefore collect the medication parcels for the family members on the same day irrespective of their refill dates.



***Flaws in home and postal deliveries should be clearly identified prior to implementing such deliveries.*** In the current contract with IPM, deliveries of medicines are also made to clinics. Most clinics do not have a pharmacist hence pharmacists at CHCs engage in rotations to dispense the medication at the clinics. However, with the shortages of pharmacists, this increases the work load of pharmacists. The tender for a new service provider stipulate expanding delivery to homes and postal deliveries. The concept of initiating other modes of delivery is ideal for reducing pressure at CHCs. Although this will be a solution to decreasing the volumes at dispensaries, they could be potential challenges and disadvantages which need to be addressed. The low level of education of some of the patients requires the monthly reinforcement and counselling by the pharmacist on their medication. Home and postal deliveries will therefore deprive some patients of receiving such pharmacist services.

***ARVs should also be dispensed through the centralised system.*** With the high prevalence and burden imposed by HIV/AIDS in South Africa, large volumes of patients present to dispensaries for their monthly medication. If ARVs are included, the HIV/AIDS patients will still undergo their monthly routine checkups with the nurses when they visit the CHCs but they will not have to wait at the dispensary as their medication will be pre-packed. Changes in prescriptions will be handled like any other chronic patient. Donor organisations which are currently involved in rolling out ARVs in the public sector might be interested in funding the project reducing financial pressure on the government.

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## ***PART 5: QUESTIONNAIRES AND CONSENT FORMS***

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### **Appendix 1: Questionnaire for patients receiving medication from CDU**

Name of CHC :
Date :
Interviewer :

#### **SECTION A : DEMOGRAPHICS**

Please provide the following information regarding yourself.

1. Are you collecting the medication for yourself?

☐ Yes

☐ No

*If no, stop interview unless they meet the criteria.*

*If yes, continue with interview*

2. How long have you been collecting your medication from the CDU?

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3. How old are you?

☐ <21

☐ 41-50

☐ >70

☐ 21-30

☐ 51-60

☐ 31-40

☐ 61-70

4. What is your gender?

☐ Male

☐ Female

5. What is your racial group?

☐ White

☐ Coloured

☐ Asian

☐ Black

6. What is your current employment status?

☐ Self-employed

☐ Employed (full-time)

☐ Pensioner/Retired

☐ Employed(part-time)

☐ Student

7. What is your occupation?

8. What is your total monthly household income?

☐ <R2000

☐ R10 001-R15 000

☐ R2 001-R5 000

☐ >R15 001

☐ R5 001-R10 000

10. What was the highest grade of education that you completed?

☐ Lower than Matric

☐ Matric

☐ Tertiary

11. Do you have any dependants who you stay with?

☐ Yes

☐ No

12. If yes, how many and how old?

13. Which chronic diseases do you suffer from?

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14. Which medication do you receive?

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15. Has there been an improvement in the management of your condition with the CDU?

☐ Yes

☐ No

16. Pharmacists are trained to help you manage your condition. For the next questions, please indicate the extent to which your pharmacist helps with the following using 1= Always 2=Most of the time 3= Sometimes and 4= Never

a. Identifying and monitoring medication side effects	
b. Education and/or counselling on your disease condition	
c. Advise on any non-pharmacological ways of managing your condition	

## SECTION B: FINANCIAL IMPACT ON HOUSEHOLD

Please answer the following questions following your experience before and after the CDU system was implemented.

	Before CDU	After CDU
1. How long did it take you to collect your medication?		
2a. Who did you leave the child with?		
2b. Did you pay?.		

2c. If yes, how much?		
3. Did you take a day off to collect your medication?		
4. How often did you run out of medication before being able to collect a refill at the CHC?		
5. Have you ever bought an emergency supply at the local pharmacy?		
6. If yes, how often?		
7. How much did you spend?		
8. Do you incur any transport costs to collect your medication?		
9. If yes, how much?		
10. On a scale of 1-10 how do you rate: a. your relationship with the staff at the CHC? b. public health services?		

2. Any other comments:

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## Appendix 2: Questionnaire for control patients

Name of CHC :
Date :
Interviewer :

### SECTION A : DEMOGRAPHICS

Please provide the following information regarding yourself.

1. Are you collecting the medication for yourself?

☐ Yes

☐ No

*If no, stop interview unless they meet the criteria.*

*If yes, continue with interview*

2. How long have you been collecting your medication from the CDU?

\_\_\_\_\_

3. How old are you?

☐ <21

☐ 41-50

☐ >70

☐ 21-30

☐ 51-60

☐ 31-40

☐ 61-70

4. What is your gender?

☐ Male

☐ Female

5. What is your racial group?

☐ White

☐ Coloured

☐ Asian

☐ Black

6. What is your current employment status?

- ☐ Self-employed                      ☐ Employed (full-time)
- ☐ Pensioner/Retired                      ☐ Employed(part-time)
- ☐ Student

7. What is your occupation?

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8. What is your total monthly household income?

- ☐ <R2000                      ☐ R10 001-R15 000
- ☐ R2 001-R5 000                      ☐ >R15 001
- ☐ R5 001-R10 000

10. What was the highest grade of education that you completed?

- ☐ Lower than Matric
- ☐ Matric
- ☐ Tertiary

11. Do you have any dependants who you stay with?

- ☐ Yes                      ☐ No

12. If yes, how many and how old?

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13. Which chronic diseases do you suffer from?

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Which medication do you receive?

15. Pharmacists are trained to help you manage your condition. For the next questions, please indicate the extent to which your pharmacist helps with the following using 1= Always 2=Most of the time 3= Sometimes and 4= Never

a. Identifying and monitoring medication side effects	
b. Education and/or counselling on your disease condition	
c. Advise on any non-pharmacological ways of managing your condition	

## SECTION B: FINANCIAL IMPACT ON HOUSEHOLD

Please answer the following questions following your experience when collecting your medication.

	Response
1. How long does it take you to collect your medication?	
2a. Who did you leave the child with?	
2b. Do you pay?.	
2c. If yes, how much?	
3. Do you take a day off to collect your medication?	
4. How often do you run out of medication before being able to collect a refill at the CHC?	
5. Have you ever bought an emergency supply at the local pharmacy?	
6. If yes, how often?	
7. How much did you spend?	

8. Do you incur any transport costs to collect your medication?	
9. If yes, how much?	
10. On a scale of 1-10 how do you rate: a. your relationship with the staff at the CHC? b. public health services?	

2. Any other comments:

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### Appendix 3: Long interview with the manager at the CDU

1. How long have you been involved in the CDU?
2. How can you describe the partnership between the state and IPM?
3. What information do you supply the DOH and how do they use it?
4. What financial implications on the DOH have been a result of implementing the CDU?
5. Has there been any adjustment in capacity at community level to cater for CDU?
6. Is the service going to be rolled out to other provinces?

#### Appendix 4: Questionnaire for pharmacists working at CHC

Name of CHC :
Date :
Interviewer :

1. How long have you been employed at the CHC?

2. How long has the CHC been receiving medication from the CDU?

3. Please answer the following questions following your experience before and after the CDU system was implemented.

	Before CDU	After CDU
1. How long did it take you to dispense chronic medication per patient?		
2. Do you offer any comprehensive pharmaceutical care to your patients?		
3. On a scale of 1-10 how do you rate the following: a. job satisfaction? b. work pressure? c. relationship with patients?		

4. How satisfied are you with the CDU?

- ☐ Very satisfied
- ☐ Fairly satisfied
- ☐ Satisfied
- ☐ Indifferent
- ☐ Not at all satisfied

5. Any other comments:

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## Appendix 5: Consent forms

### UNIVERSITY OF CAPE TOWN

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#### Health Economics Unit

Department of Public Health & Family Medicine

Faculty of Health Sciences

Anzio Road

Observatory 7925

SOUTH AFRICA

Telephone: (+27 21) 406 6575

Fax: (+27 21) 448 8152

My name is Esnath Munyikwa and I am a masters student at the Health Economics Unit of University of Cape Town. I am conducting a research study on the financial implications of the Chronic Dispensing Unit (CDU) in Western Cape. You are being selected to participate in the study because your community health centre is currently receiving / not receiving chronic medication from the CDU.

If you are uncomfortable to answer any questions during the interview process, feel free not to participate or to refuse to answer any question. Your responses will not be linked to your name in any way and confidentiality will be maintained at all times. By participating in this study, the provision of healthcare to you will not be affected. You will have no direct benefits from participating in the study. However the results of the study will hopefully aid decision makers in decisions on expanding the concept of centralised chronic dispensing.

If you have questions regarding your rights as a research subject, contact the Research Office at the Faculty of Health Sciences at the University of Cape Town at 021 650 4015. Should you require any information, do not hesitate to contact the researcher.

We hope that you will respond favorably to this request.

Yours sincerely,

Esnath N. Munyikwa

Principal researcher

0769467486

Esnath.Munyikwa@uct.ac.za

**Consent to Participation in the Study:**

**Implications of the Centralised Chronic Dispensing Unit in Western Cape.**

Principal Investigator:

Esnath Munyikwa, Student, University of Cape Town

**SIGNATURE OF PARTICIPANT**

The information above was described to me by \_\_\_\_\_ and I was given the opportunity to ask questions and these questions were answered to *my* satisfaction.

*I hereby consent voluntarily to participate in this study.*

\_\_\_\_\_

**Name of Participant**

\_\_\_\_\_

**Signature of Participant**

**Date**

\_\_\_\_\_

**SIGNATURE OF INVESTIGATOR**

I declare that I explained the information given in this document to \_\_\_\_\_  
[*name of the participant*]. [*He/she*] was encouraged and given ample time to ask me any questions. This conversation was conducted in [*Afrikaans/\*English/\*Xhosa*].

\_\_\_\_\_

**Name of interviewer**

\_\_\_\_\_

**Signature of Interviewer**

\_\_\_\_\_